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AMERICAN PHARMACOPŒIA.

THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA, EIGHTH DECENNIAL REVISION.

A Contribution from SCHIMMEL & Co., Leipzig.[1]

The new edition of the American Pharmacopœia has deservedly met with general approbation. There are everywhere evidences of a serious effort to make the widest possible use of the achievements of science; particularly is this the case in the directions for testing. This also applies especially to the essential oils, which are mostly described in detail in such manner that the American Pharmacopœia may in this respect be characterized to a certain extent as typical. This favorable opinion of the whole does not preclude that some statements made in the Pharmacopœia are not correct, and also that several directions for testing call for criticism. For the sake of expediency, we will first of all discuss the specific gravities required by the Pharmacopœia, in a connected form, and then deal with the oils themselves.

As already mentioned by us in our Report of October, 1905, p. 74, the new American Pharmacopœia does not indicate these specific gravities of the essential oils, as is usually done, at $\frac{15^\circ}{15^\circ}$, but at $\frac{25^\circ}{25^\circ}$. This rule has induced us to determine for all essential oils included in the Pharmacopœia, the differences existing between the specific gravities at $\frac{15^\circ}{15^\circ}$ and at $\frac{25^\circ}{25^\circ}$, so as to form an opinion whether

[1]Printed from advance sheets of the Semi-annual Report of Schimmel & Co., April-May, 1906.

and in how far the limits of value given in the Pharmacopœia agree with those obtained at 15°. We have here in several cases found more or less considerable differences. For the purpose of a better review, we have combined the results obtained in a tabulated form (p. 256). The limits of value given in the American Pharmacopœia, which do not agree with ours, are printed in italic type. These limits printed thus cannot and should not in our opinion be accepted as such, for they are inconsistent with the values fixed for 15°, and are consequently incorrect. Differences of 1 in the third decimal figure have been left out of account, as they lie within the limits of error. We would still mention that the differences between the specific gravities determined at $\frac{15°}{15°}$ and at $\frac{25°}{25°}$, as given by us, agree well on the whole with those ascertained previously by Schreiner and Downer,[1] and also that the average value of these differences is the same as that found by those authors, viz. 0·00064 per degree of temperature.

Of alcohols, the American Pharmacopœia recognizes a strong alcohol of 94·9 per cent. by volume (Alcohol), and a weak one of 48·9 per cent. by volume (Alcohol dilutum). In the following pages the former is designated simply as "alcohol."

Anise Oil (*Oleum anisi*).—Colorless or faintly yellow; $d_{25°}$ 0·975 to 0·985;[2] $a_{D25°-20°}$[3]; solidifying point not below + 15°; soluble in an equal volume alcohol and in 5 vol. 90 per cent. alcohol.

Benzaldehyde (*Benzaldehydum*).—Colorless liquid, strongly refractive, with at least 85 per cent. pure benzaldehyde;[4] $d_{25°}$ about 1·045; $a_D \pm 0°$; boiling point 179 to 180°; soluble in alcohol in every proportion; test for absence of chlorinated products.

Bitter Almond Oil (*Oleum amygdalæ amaræ*).—Colorless or yellow; content of benzaldehyde at least 85 per cent.;[5] content of hydro-

[1] Phar. Archives 4 (1901), 165. Report April, 1902, 80.

[2] The upper limit of value should be 0·988, as otherwise especially the oils richest in anethol, and consequently the most valuable anise oils, could not be used. Comp. also the table (p. 256).

[3] This should read: up to — 2°.

[4] According to the method of determination by means of neutral sodium sulphite indicated by the Pharmacopœia, we found it impossible to obtain even approximately satisfactory results; for this reason, we greatly doubt the usefulness of this method.

[5] Comp. note under benzaldehyde.

cyanic acid between 2 and 4 per cent.;[1] $d_{25°}$ 1·045 to 1·060;[2] $a_D \pm 0°$;[3] boiling point about 180°; soluble in every proportion in alcohol, also in an equal volume 70 per cent. alcohol;[4] test for absence of chlorinated products.

CAJEPUT OIL (*Oleum cajuputi*).—Colorless or greenish, cineol-content at least 55 per cent. by volume;[5] $d_{25°}$ 0·915 to 925;[6] lævo-rotatory, $a_{D25°}$ not above — 2°;[7] soluble in every proportion in alcohol, also in 1 part 80 per cent. alcohol.

CAMPHOR (*Camphora*).—White, transparent mass; $d_{25°}$ 0·990; a_D to the right; melting point 175°; boiling point 204°.

CARAWAY OIL (*Oleum cari*).—Colorless or pale yellow; $d_{25°}$ 0·905 to 0·915;[8] $a_{D25°}$ + 70 to + 80°; soluble in an equal volume alcohol, and in 3 to 10 volumes 80 per cent. alcohol.

CASSIA OIL[9] (*Oleum cinnamomi*).—Yellowish or brownish; content of cinnamic aldehyde at least 75 per cent. by volume; $d_{25°}$ 1·045 to

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[1] Such a content of hydrocyanic acid cannot always be guaranteed.

[2] The specific gravity given is for a temperature of 15°, but it should be taken into consideration that even in the case of absolutely normal oils, it often amounts to 1·070; for 25° the following figures apply: 1·038 to 1·063 (comp. table.

[3] Occasionally a feeble optical activity is also observed.

[4] Of 70 per cent. alcohol 1 to 2 volumes are required to dissolve the oil.

[5] The estimation of cineol is accomplished by means of phosphoric acid in the following manner: 10 c.c. oil are dissolved in 50 c.c. petroleum ether, and to the well cooled solution (freezing mixture) is gradually added, whilst stirring, concentrated phosphoric acid, until the white compound separating off acquires a yellowish (or reddish) shade. The crystalline mass is then filtered off with a suction pump, washed with petroleum ether, pressed to remove the last liquid portions, and decomposed with water. The cineol separated off is estimated volumetrically and the percentage calculated.

We have again convinced ourselves by estimations of mixtures of a known cineol-content, that this method does not always give reliable results. This applies specially to oils less rich in cineol; for example, in mixtures of 50 per cent., the content of cineol found was up to 8 per cent. too little, although we endeavored by different small improvements, to avoid sources of error as much as possible. For this reason, the cineol estimations can only lay claim to approximate accuracy.

[6] As lower limit of value, 0·913 is to be recommended (comp. table).

[7] With pure distillates, we have observed rotations up to — 2° 40′.

[8] The specific gravity given applies to a temperature of 15°; it should read: $d_{25°}$ 0·899 to 0·909 (comp. table).

[9] Only the rectified oil answers the requirements given.

1·055;[1] $a_{25°}$ between — 1° and + 1°; soluble in 2 volumes 70 per cent. alcohol.

	$d\frac{15°}{15°}$	$d\frac{25°}{25°}$	Difference.	Limits of value at $\frac{15°}{15°}$	Limits of value at $\frac{25°}{25°}$	American Pharmacopœia $\frac{25°}{25°}$
Anise Oil	0·9915	0·9855	0·0060	0·984—0·994	0·978—0·988	0·975—*0·985*
Benzaldehyde	1·0504	1·0515	0·0069	1·050—1·055	1·043—1·048	about 1·045
Bitter Almond Oil	1·0655	1·0587	0·0068	1·045—1·070	1·038—1·063	*1·045—1·060*
Cajeput Oil	0·9215	0·9151	0·0064	0·919—0·930	0·913—0·924	*0·915*—0·925
Caraway Oil	0·9080	0·9023	0·0057	0·905—0·915	0·899—0·909	*0·905*—0·915
Cassia Oil, rect.	1·0551	1·0489	0·0062	1·053—1·065	1·047—1·059	1·045—*1·055*
Chenopodium Oil	0·9769	0·9706	0·0063	?		0·965—0·985
Cinnamic aldehyde	1·0560	1·0504	0·0056	1·054—1·058	1·048—1·052	about *1·047*
Clove Oil	1·0487	1·0422	0·0065	1·040—1·060	1·033—1·053	*1·040*—1·060
Copaiba Oil	0·9056	0·9002	0·0054	0·900—0·920	0·895—0·915	0·895—*0·905*
Coriander Oil	0·8739	0·8672	0·0067	0·870—0·880	0·863—0·873	0·864—0·878
Cubeb Oil	0·9214	0·9159	0·0055	0·915—0·930	0·909—0·924	0·905—0·925
Erigeron Oil	0·8865	0·8803	0·0062	0·850—0·870	0·844—0·864	0·845—0·865
Eucalyptol	0·9294	0·9227	0·0067	0·928—0·930	0·921—0·923	*0·925*
Eucalyptus Oil	0·9146	0·9083	0·0063	0·910—0·930	0·904—0·924	0·905—0·925
Eugenol	1·0716	1·0650	0·0066	1·071—1·074	1·064—1·067	*1·072*—1·074
Fennel Oil	0·9715	0·9653	0·0062	0·965—0·977	0·959—0·971	0·953—0·973
Hedeoma Oil (Oil of Amer. Pennyroyal)	0·9331	0·9271	0·0060	0·925—0·940	0·919—0·934	0·920—0·935
Oil of Juniper berries	0·8655	0·8593	0·0062	0·860—0·885	0·854—0·879	*0·860*—0·880
Lavender Oil	0·8864	0·8797	0·0067	0·882—0·895	0·875—0·888	*0·880*—0·892
Lemon Oil	0·8585	0·8527	0·0058	0·857—0·861	0·851—0·855	0·851—0·855
Mustard Oil	1·0200	1·0120	0·0080	1·016—1·025	1·008—1·017	*1·013*—1·020
Nutmeg Oil	0·9037	0·8972	0·0065	0·870—0·930	0·864—0·924	0·862—*0·910*
Peppermint Oil	0·9060	0·9006	0·0054	0·900—0·920	0·895—0·915	0·894—0·914
Pimenta Oil	1·0440	1·0372	0·0068	1·025—1·055	1·018—1·048	*1·033*—1·048
Rose Oil*		0·8625			0·854—0·867	0·855—*0·865*
Rosemary Oil	0·9077	0·9011	0·0066	0·900—0·920	0·893—0·913	0·894—0·912
Safrol	1·1054	1·0985	0·0069	1·105—1·107	1·098—1·100	*1·105*—1·106
Sandalwood Oil	0·9782	0·9735	0·0047	0·975—0·9·5	0·970—0·980	0·965—*0·975*
Sassafras Oil	1·0807	1·0740	0·0067	1·070—1·082	1·063—1·075	*1·065*—1·075
Savin Oil	0·9208	0·9150	0·0058	0·910—0·930	0·904—0·924	0·903—0·923
Spearmint Oil	0·9352	0·9290	0·0062	0·920—0·940	0·914—0·934	0·914—0·934
Sweet Orange Oil	0·8509	0·8452	0·0057	0·849—0·853	0·843—0·847	0·842—0·846
Thyme Oil, white	0·9068	0·9007	0·0061	0·900—0·935	0·894—0·929	*0·900*—0·930
Turpentine Oil	0·8682	0·8616	0·0066	0·865—0·875	0·858—0·868	*0·860*—0·870
Turpentine Oil, rect.	0·8708	0·8643	0·0065	0·860—0·871	0·853—0·864	*0·860*—0·865
Wintergreen Oil:						
a. from *Betula lenta* L.	1·1870	1·1794	0·0076	1·180—1·188	1·172—1·180	1·172—1·180
b. from *Gaultheria procumbens* L.	1·1864	1·1788	0·0076	1·180—1·188	1·172—1·180	1·172—1·180
c. artificial	1·1896	1·1817	0·0079	1·185—1·190	1·177—1·182	*1·180*—1·185

* The limits of value given for rose oil were based upon those in force for $\frac{30°}{25°}$.

CHENOPODIUM OIL (*Oleum chenopodii*).—Colorless or yellow, $d_{25°}$ about 965 to 0·085;[2] lævorotatory, $a_{D25°}$ not above — 5°];[3] soluble in 5 volumes 70 per cent. alcohol.

[1] The upper limit of value given is slightly too low; it should be 1·059 (comp. table).

[2] The Pharmacopœia here quite correctly only requires approximate values, as oil of chenopodium is extremely variable owing to its content of a constituent which decomposes very readily; this also causes changes in the specific gravity.

[3] We have observed with good commercial oils, rotations up to — 6°.

CINNAMIC ALDEHYDE (*Cinnaldehydum*).—Colorless;[1] containing at least 95 per cent. pure cinnamic aldehyde; $d_{25°}$ about 1·047;[2] $a_D \pm 0°$; boils about 250° with decomposition; solidifies in a freezing mixture and melts again at — 7·5°; soluble in every proportion in alcohol.

CLOVE OIL (*Oleum caryophylli*).—Colorless or pale yellow; eugenol-content at least 80 per cent. by volume; $^{d}_{25°}$ 1·040 to 1·060;[3] soluble in an equal volume alcohol, and in about 2 volumes 70 per cent. alcohol.

COPAIBA OIL (*Oleum copaibæ*).—Colorless or pale yellow, $d_{25°}$ 0·895 to 0·905;[4] a_D to the left; soluble in 2 vol. alcohol.[5]

CORIANDER OIL (*Oleum coriandri*).—Colorless or faintly yellow; $d_{25°}$ 0·863 to 0·878; $a_{D25°}$ + 7 to + 14°; soluble in 3 volumes 70 per cent. alcohol; in 80 and 90 per cent. alcohol soluble in every proportion.

OIL OF CUBEBS (*Oleum cubebæ*).—Colorless, pale green, or yellow; $d_{25°}$ 0·905 to 0·925; $a_{D25°}$ — 25 to — 40°.

ERIGERON OIL (*Oleum erigerontis*).—Faintly yellow; $d_{25°}$ 0·845 to 0·865; $a_{D25°}$ about + 50°; soluble in an equal volume alcohol.

EUCALYPTOL.—Colorless; $d_{25°}$ 0·925;[6] $a_D \pm 0°$; boiling point 176 to 177°; solidifies on cooling into needle-shaped crystals, which melt at — 1°;[7] soluble in every proportion in alcohol.

EUCALYPTUS OIL (*Oleum eucalypti*).—Colorless or faintly yellow;[8] cineol-content at least 50 per cent. by volume;[9] $d_{25°}$ 0·905 to 0·925;

[1] Cinnamic aldehyde is not colorless, but bright yellow.

[2] The statement of the specific gravity is not correct, it should read $d_{25°}$ 1·048 to 1·52 (comp. table).

[3] As oils with a eugenol-content down to 80 per cent. are admitted, the lower limit of the specific gravity should be reduced to 1·033 (comp. table).

[4] The specific gravity at 15° amounts to up to 0·918, as we have recently observed with one of our own distillates (comp. Report April, 1905, 25). The specific gravity mentioned corresponds to the value 0·915 at 25° (see table).

[5] On the strength of observations with authentic material we are in a position to state that 1 vol. copaiba oil requires 5 to 10 vol. 95 per cent. alcohol to form a solution. See Report, April, 1905, 25.

[6] The specific gravity at 25° is not 0·925, but fluctuates between 0·921 and 0·923 (comp. table).

[7] Solidification has to be started in case of need by rubbing a glass rod on the wall of the vessel.

[8] The oil has occasionally also a greenish shade.

[9] With regard to the cineol-estimation, compare what has been said under cajeput oil.

a_D 25° not above + 10°; soluble in every proportion in alcohol and in 3 volumes 70 per cent. alcohol; free from phellandrene.

EUGENOL.—Colorless or faintly yellow; $d_{25°}$ 1.072 to 1.074[1]; a_D ± 0°; boiling point 251 to 253°; soluble in every proportion in alcohol, and in 2 parts 70 per cent. alcohol.

FENNEL OIL (*Oleum fœniculi*).—Colorless or faintly yellow; $d_{25°}$ 0.953 to 0.973; solidification point not below + 5°;[2] soluble in an equal volume alcohol, likewise in 10 volumes or less 80 per cent. alcohol.

OIL OF HEDEOMA or AMERICAN PENNYROYAL (*Oleum hedeomæ*).—Faintly yellow; $d_{25°}$ 0.925 to 0.935; a_D 25° from about + 18 to + 22°; soluble in 2 and more vols. 70 per cent. alcohol.

OIL OF JUNIPER BERRIES (*Oleum juniperi*).—Colorless, faintly green or yellow; $d_{25°}$ 0.860 to 0.880;[3] soluble in 10 volumes 90 per cent. alcohol.[4]

LAVENDER OIL (*Oleum lavandulæ florum*).—Colorless or yellow; $d_{25°}$ 0.880 to 0.892;[5] soluble in 3 vol. 70 per cent. alcohol.

LEMON OIL (*Oleum limonis*).—Faintly yellow, citral-content not less than 4 per cent.;[6] $d_{25°}$ 0.851 to 0.855; $a_{D25°}$ not below +

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[1] These figures apply to 15°; at 25° the specific gravity lies between 1.064 and 1.067 (comp. table).

[2] Solidification must in case of need be introduced by inoculation with a small crystal of anethol. The lowest limit of the solidification point might suitably be + 4°, as in commercial products it is usually found between + 4 and + 6°.

[3] Oil of juniper berries is also frequently lighter; a lowest limit of 0.854 would be more suitable (comp. table).

[4] The specification of solubility is mostly only answered by quite fresh distillates; even when kept in a rational manner the solubility of oil of juniper berries diminishes rapidly.

[5] The lower limit of the specific gravity is not correct; it should read: 0.875 (comp. table).

[6] The citral-determination is made by Sadtler's method (comp. Reports, April, 1904, 47, and October, 1904, 119) with this extension, that in addition to the actual test also a "blind" test without oil is made; this is no doubt a decided step in advance as in this manner the end of the reaction can be observed or approximated somewhat better, but in the tests made by us we have again come to the conclusion that a really exact determination is not possible even in this manner, and for this reason we must continue, as before, to characterize the method as unreliable.

60°;[1] a_D of the first 10 per cent. of the distillate may only differ 2° from the angle of rotation of the oil.[2]

MENTHOL.—Colorless needle-shaped or prismatic crystals, melting point 43°; boiling point 212°; alcoholic solution neutral and lævorotatory.

MUSTARD OIL (*Oleum sinapis volatile*).—Colorless or faintly yellow; $d_{25°}$ 1·013 to 1·020;[3] boiling point 148 to 152°; lowest content of allyl isothiocyanate 92°;[4] soluble in every proportion in alcohol.

NUTMEG OIL (*Oleum myristicæ*).—Colorless or faintly yellow; $d_{25°}$ 0·862 to 0·910;[5] $a_{D25°}$ + 14 to + 28°;[6] soluble in an equal vol. alcohol, and in 3 vol. 90 per cent. alcohol. When 2 to 3 c.c. oil are evaporated, no crystallizing residue should remain behind.

PEPPERMINT OIL[7] (*Oleum menthæ piperitæ.*)—Colorless;[8] $d_{25°}$ 0·894 to 0·914; $a_{D25°}$ — 25 to — 33°; ester (menthyl acetate) at least 8 per cent.;[9] total menthol (free and esterified) at least 50 per cent.; soluble in an equal vol. alcohol; the solution in 4 volumes 70 per cent. alcohol may at most show a feeble opalescence.

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[1] The rotation of lemon oil varies considerably with the temperature; the one given above would correspond to a rotation of 60° 41′ at the usual observation temperature of 20°. As pure oils are frequently met with, with a rotation down to 58°, and as most oils rotate about 60°, the above requirement of the Pharmacopœia does not take the actual facts sufficiently into account.

[2] According to our experience, the difference in pure oils frequently amounts to up to 5°.

[3] The lower limit is given too high, and should be 1·008 (comp. table).

[4] With regard to the determination, comp. the April-May Report, p. 44.

[5] The upper limit is given too low and must be increased to 0·924 as otherwise just the oil from the best material is excluded from medicinal use. Comp. Report October, 1904, 65; see also table.

[6] We have observed in our own distillates from nutmeg of best quality, rotations down to + 7° 52′. Comp. Report October, 1904, 65.

[7] The requirements given for peppermint oil are partly contradictory, so that it is not clear whether the oil from the State of New York ("Wayne County Oil") or that from Michigan ("Western Oil") is to be the official oil. Whereas the rotation applies chiefly to the first-named oil (Michigan oil rotates between — 18 and — 29°), the requirements of solubility exclude the former, as the New York oil is not soluble in 70 per cent. alcohol. It is difficult to understand why both oils are not admitted.

[8] Peppermint is not always colorless, but sometimes yellowish or greenish yellow.

[9] The ester-content is frequently lower; we have observed in authentic oils down to 4 per cent.

PIMENTA OIL (*Oleum pimentæ*).—Colorless, yellow or reddish; eugenol-content at least 65 per cent. by volume; $d_{25°}$ 1·033 to 1·048;[1] soluble in every proportion in 90 per cent. alcohol and also in 2 vol. 70 per cent. alcohol.

ROSE OIL (*Oleum rosæ*).—Faintly yellow; $d_{25°}$ 0·855 to 0·865;[2] saponification number 10 to 17;[3] solidifying point between 18 and 22°.[4]

ROSEMARY OIL (*Oleum rosmarini*).—Colorless or faintly yellow; $d_{25°}$ 0.894 to 0·912; $a_{D25°}$ not above + 15°; the first 10 per cent. of the distillate must also be dextrorotatory. Ester-content (calculated as bornyl acetate) at least 5 per cent.; total borneol at least 15 per cent.;[5] soluble in 0·5 and more vol. 90 per cent. alcohol, and also in 2 to 10 vol. 80 per cent. alcohol.

SAFROL (*Safrolum*).—Colorless or faintly yellow; $d_{25°}$ 1·105 to 1·106;[6] $a_D \pm 0°$; boiling point about 233°; when cooled to — 20° or below, it solidifies into a crystalline mass which does not melt below + 11°; soluble in about an equal volume alcohol, and in about 30 volumes 70 per cent. alcohol.

SANDALWOOD OIL, EAST INDIAN (*Oleum santali*).—Faintly yellow; $d_{25°}$ 0·965 to 0·975;[7] $a_{D25°}$ — 16 to — 20°; santalol-content not below 90 per cent.;[8] soluble in 5 vol. 70 per cent. alcohol.

SASSAFRAS OIL (*Oleum sassafras*).—Yellow or reddish yellow;

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[1] The lower limit of value is given too high, and should be 1·018. Comp. table; see also German Report April, 1899, 39.

[2] The upper limit is given too low, and should be 0·867 (comp. table).

[3] We have observed in pure oils saponification numbers between 8·5 and 19.

[4] As upper limit for the solidifying point 23·5° might be recommended.

[5] These requirements cannot be upheld; we have observed in good oils an ester-content down to 1·2 per cent., and a total content of borneol down to about 10 per cent.

[6] The *data* of the specific gravity approximately correspond to those determined for 15°: 1·105 to 1·107; at 25° the specific gravity varies between 1 098 and 1·100 (comp. table).

[7] The upper limit of value is too low, it should be 0·980 (comp. table).

[8] It is to be regretted that the Pharmacopœia bases its calculation of santalol on the formula $C_{15}H_{26}O$. We have already repeatedly pointed out that according to recent investigations the formula $C_{15}H_{24}O$ is undoubtedly more correct. Comp. Report, October, 1900, 58, and the April-May Report, p. 59. The lowest content of 90 per cent. mentioned above, and based upon $C_{15}H_{26}O$, corresponds to a minimum of 89·2 per cent. calculated on $C_{15}H_{24}O$.

$d_{25°}$ 1·065 to 1·075;[1] $a_{D25°}$ not above + 4°; soluble in every proportion in 90 per cent. alcohol.[2]

SAVIN OIL (*Oleum sabinæ*).—Colorless or yellowish; $d_{25°}$ 0·903 to 0·923; $a_{D25°}$ + 40 + 60°; soluble in about 0·5 volumes and more 90 per cent. alcohol.

SPEARMINT OIL (*Oleum menthæ viridis*).—Colorless, yellow, or greenish yellow; $d_{25°}$ 0·914 to 0·934; $a_{D25°}$ — 35 to — 48°; with an equal volume 80 per cent. alcohol it forms a clear solution which becomes cloudy when further diluted.

SWEET ORANGE OIL (*Oleum aurantii corticis*).—Faintly yellow;[3] $d_{25°}$ 0·842 to 0·846; $a_{D25°}$ not below + 95°.[4]

THYME OIL (*Oleum thymi*).—Colorless;[5] $d_{25°}$ 0·900 to 0·930;[6] feeble lævorotation, $a_{D25°}$ not above — 3°;[7] phenol-content at least 20 per cent. by volume; soluble in 0.5 vol. alcohol and in 1 to 2 vol. 80 per cent. alcohol.

THYMOL.—Large colorless, transparent rhombic prisms; $d_{25°}$ 1·030; melting point 50 to 51°; the alcoholic solution is optically inactive.

TURPENTINE OIL (*Oleum terebinthinæ*).—Colorless; $d_{25°}$ 0·860 to 0·870;[8] on distillation, the bulk should pass over between 155 and 162°; soluble in 3 vol. alcohol.

TURPENTINE OIL, RECTIFIED (*Oleum terebinthinæ rectificatum*).—Colorless; $d_{25°}$ 0·860 to 0·865.[9]

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[1] For the lower limit of value, 1·063 is more suitable (comp. table).

[2] Not every oil answers this requirement. We have again recently found in one of our own distillates, that 1 to 2 vol. 90 per cent. alcohol are required to dissolve 1 vol. sassafras oil; this observation agrees with those repeatedly made with good commercial oils. Comp. also the April-May Report, p. 61.

[3] The color of orange oil is yellow to yellow-brown.

[4] Calculated for 20°, the rotation is + 96°; we have observed as lowest value at 20° + 95° 30′.

[5] The rectified oils also frequently acquire again the red-brown color of the crude oil.

[6] 0·900 is too high as lowest limit of value, and this should be 0·894 (comp. table).

[7] We have also repeatedly observed oils with a feeble dextrorotation; further, the rotation is sometimes a little higher than indicated in the Pharmacopœia. In most cases, the optical behavior of the oil can only be determined approximately on account of the dark color.

[8] It would be more correct to fix 0·858 as the lowest limit of value (comp. table).

[9] The lower limit applies to a temperature of 15°; for 25° it is 0·853 (comp. table).

VANILLIN.—Fine, white, crystalline needles; soluble in about 100 parts water of 25°, and in 15 parts of 80°; readily soluble in alcohol; melting point 80 to 81°.

WINTERGREEN OIL:

a. FROM BETULA LENTA L. (*Oleum betulæ*).—$a_D \pm 0°$; for the rest, the same properties as *Oleum gaultheriæ*.

b. FROM GAULTHERIA PROCUMBENS L. (*Oleum gaultheriæ*).—Colorless or almost colorless;[1] $d_{25°}$ 1·172 to 1·180; feeble lævorotation, $a_{D25°}$ up to — 1°; boiling point 218 to 221°.

c. ARTIFICIAL WINTERGREEN OIL (*Methylis salicylas*).—Colorless; $d_{25°}$ 1·180 to 1·185;[2] $a_D \pm 0°$; boiling point 219 to 221°; soluble in every proportion in alcohol.

ASSAY OF OPIUM AND ITS PREPARATIONS.[3]

BY PHILIP ASHER, PH.G., M.D.

A reliable and rapid method for the assay of opium and its preparations has long been a desideratum. In reviewing methods in vogue the one that appears most plausible, rational, easily-understood and practically under the full control of the operator, is the English method, as recently modified by Stevens. This method, however, has not given the results that had been expected of it, and in the Proceedings of the A. Ph. A., 1904, L. F. Kebler, Chief of the Drug Laboratory, U. S. Department of Agriculture, compiled results of various workers, which showed a lesser percentage than that obtained from other methods. In the outlines of the American Association of Agricultural Chemists, work for drugs for 1905, this subject is again taken up and a review of the methods suggested therein shows they do not contain the several new features embodied in this paper.

The process, as now again modified, has been found in the hands of the author to give results within a few milligrammes, of the quantity of morphine originally taken. Due credit must be given to Prof. A. B. Stevens, University of Michigan, and the principal point of my

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[1] The oils are frequently of a reddish color, owing to traces of iron.

[2] The lower limit is given too high; it should be 1·177 (comp. table).

[3] Read before the Alumni Association of the New Orleans College of Pharmacy.

labor was to ascertain where the error lay and to correct the same, if possible.

The full modified process will first be given. (The portions in italics are the additions.) After which, such points will be dilated upon as may prove of interest, as well as giving reasons for the changes.

Place 4 grammes of dried or powdered opium in a 100 c.c. tared porcelain evaporating dish, "*add 5 c.c. of KOH solution, 5 per cent. or its equivaleut of a stronger solution, mix thoroughly with a rubber-tipped glass rod and evaporate on water-bath or drying closet, until of constant weight,*" then add 2 grammes of dry, freshly-slaked lime and 10 c.c. of water and triturate continually for fifteen minutes until a perfectly smooth mixture results. Finally, add 19 c.c. of water, triturating frequently during half an hour and filter through a dry filter about 10 centimeters in diameter. Transfer exactly 15 c.c. to a 100 c.c. Erlenmeyer flask and add to this 4 c.c. of alcohol and 10 c.c. of concentrated ether and shake the mixture. Then add ·500 gramme ammonium chloride. Shake well and frequently during half an hour. Set aside in a cool place for twelve hours.

Remove the stopper carefully and preserve with any adhering crystals, for future use. Pour the ethereal layer into a small funnel, the neck of which has been previously closed with a piece of absorbent cotton. Rinse the flask with 10 c.c. of ether, shake continually for five minutes and pour as before into the funnel, and when this has passed through, pour the contents of the flask into the funnel. *Add 5 c.c. of ether to the flask, rotate gently and pour into funnel, repeating with 5 c.c. more of ether.* Without trying to remove all the crystals from the bottle, wash the flask and contents of the funnel with saturated solution of morphine, small portions at a time, *using 15 c.c. in all.* When the crystals have drained, place the funnel in the bottle containing adhering crystals, and with a small rod drawn out to a curved point, lift the cotton and rinse the crystals into the bottle with 12 c.c. of decinormal sulphuric acid, using the cotton on the end of the rod to detach any adhering crystals. Place the cotton carefully into the flask, replace the stopper and agitate until the crystals are all dissolved. Rinse the cork and funnel with water, titrate the excess of acid with fortieth normal potassium hydroxide solution, using hæmatoxylin as an indicator.

Divide the number of cubic centimeters of potassium hydroxide

solution used by 4 and subtract the product from the 12 c.c. of acid used; the remainder will be the amount of acid consumed by the morphine, which number must be multiplied by ·030092, in turn dividing the last product by 2, which will give the per cent. of morphine obtained, but to which should be added ·070 as the corrective factor of the loss of morphine during estimation.

The above calculation can be materially lessened by multiplying the number of cubic centimeters of $\frac{n}{10}$ acid consumed by the morphine by 1·5046 and adding ·070 to the product.

ASSAY OF THE TINCTURE OF OPIUM.

"Add 5 c.c. of 5 per cent. KOH solution" to 40 c.c. of the tincture contained in a tared evaporating dish and evaporate about 8 grammes, add 2 grammes of freshly slaked dry lime and triturate to uniform mixture. Transfer to a graduated cylinder, rinsing capsule with water, using the tipped rod to facilitate same, until 30 c.c. are obtained. Drop upon the surface of the liquid 5 to 10 drops of ether, to destroy foam and air bubbles. Add water to exactly 31 c.c., close the cylinder with stopper and shake frequently during half an hour, filter, and from 15 c.c. of filtrate proceed as under opium, multiplying the number of cubic centimeters of acid consumed by ·15046 plus 70 and the product will be the number of grammes of morphine in 100 c.c. of tincture.

THE USE OF KOH SOLUTION.

The first assay carried out after the Stevens method was with the tincture and after the addition of the lime the odor of ammonia was very marked in some cases. The principle upon which this method depends is the fact that morphine is soluble in solution of calcium hydroxide and is precipitated by the ammonia produced by the action of the alkaline solution upon ammonium chloride. The presence then in the opium or tincture of ammonium compound will naturally precipitate the morphine before filtration and thus lessen the final result. Warming either opium or the tincture with KOH decomposes the ammonium compound and, as evidenced by experiment, the morphine content was greater in those cases made with the previous addition of KOH than in those made without it. It was further proven by adding to solution of morphine of known

strength small amounts of ammonium chloride and carrying out the assay with or without the addition of KOH, that in every case where the KOH solution was used, it gave a larger yield, corresponding closely to the amount of morphine originally used.

The amount of ammonium compounds present varies with each lot of opium and after a number of trials 5 c.c. has been shown to be ample.

In reference to the solution of morphine of known strength used, above referred to, I would add that a definite amount of morphine was dissolved in sufficient hydrochloric acid and to simulate as near as possible a tincture of opium, F. E. gentian and alcohol were added to it. While, of course, the other constituents of opium were lacking it gave a preparation containing at least some of the features of the tincture.

COTTON OR PAPER?

Experiments were conducted with a view to ascertain if paper possessed any advantage over cotton in retarding the passage of the small morphine crystals. Results have shown that there is practically nothing gained in the use of paper; in fact, in one or two instances, the apparent yield was in excess of the quantity used, due to the inability to thoroughly wash the paper. If care is observed in placing the cotton, it will retain all the crystals.

The better plan is to place the cotton in the funnel loosely and only force the lower portion into the neck of the funnel, leaving the balance fluffy. If the whole pledget is forced into the neck tightly, the flow will be retarded to such an extent as to vitiate the results, through the evaporation of the ether containing the narcotine.

WASHING WITH ETHER.

Stevens makes no provision for the complete removal of narcotine, which also remains behind if in any way the passage of the liquid is retarded. Experiments carried out along these lines disclose that the apparent yield of morphine is greater in the process without subsequent washing with ether than when it is used. As morphine is so slightly soluble in ether, and as only a slight rotation is directed, the solubility of the morphine in the ether used is practically nil and the function it serves is to remove the solution of narcotine by pushing it out, as it were.

WASH LIQUOR.

Experiments were conducted with saturated solutions of morphine alkaloid, hydrochloride and sulphate, to learn if they played any particular role in the final results. Solutions of the hydrochloride and sulphate offered no advantage and the morphinated water used by Stevens proved most desirable, owing to the slight solubility of morphine in water.

The 15 c.c. of liquid directed to be used after various trials, under different conditions, was found to be ample, and when lesser quantities were used the results were higher, owing to the non-removal of the alkali.

INDICATOR.

Hæmatoxylin has proven very successful in the writer's hands as the indicator in alkaloidal work. The use of the official hæmatoxylin solution has been very disappointing, not only in this, but in other methods where its use was indicated. Apparently, upon standing in contact with alcohol, a change takes place, preventing sharp end reactions. The method used was to boil distilled water in a test-tube and add to it a small crystal of hæmatoxylin and boil again for a minute. A few drops of this solution is used in each assay, and this gives an end reaction that is sharp and that will turn with less than one drop of $\frac{n}{40}$ solution.

COEFFICIENT.

The use of the coefficient or ·112 given by Stevens has been found too high and the factor .070 is nearer the difference between results obtained and the amount of substance originally taken. A review of the solubility of morphine in alcohol, water and ether, at a temperature of 25° C., compared to the amount of each used, gives one a still lower factor.

ADVANTAGES.

In comparing this process with others, it will be seen it possesses some great advantages. From the economical standpoint but 40 per cent. of the amount directed by the Pharmacopœia is required. Twenty c.c. has also been used with equally gratifying results, and no doubt even lesser amounts would show up as well. The use of small quantities with some degree of accuracy is desirable, especially to the analyst.

The ease of its application, as well as its rapidity, is much to be desired and when compared with the official method, is much to be preferred. But one evaporation and filtration is necessary and the whole work is actually performed in less than two hours. But one step in the whole method is to be deprecated, and that is from the strictly scientific point of view—the use of aliquot parts.

Unfortunately, the nature of the substance with which we are dealing offers no method wherein the use of the aliquot part and an alkali could be avoided. Endeavoring, however, to overcome this objection, the use of KOH was substituted for the calcium hydroxide and while the results were within the radius of accuracy, the resultant morphine was highly colored, which prevented its titration in the usual way, and the process, at best, was altogether too tedious and possessed no advantage over others.

Determinations were made with powdered opium, using the U. S. Pharmacopœia, Stevens and the modified method of the author, and while the results were in favor of the U. S. Pharmacopœia method, if the correction factor was used it turned the balance in favor of the last method, and as the U. S. Pharmacopœia method does not take into consideration the possible loss by solution, it is safe to assume that this method would give equal results.

Before concluding, I would call attention to one point, which is of prime importance from the legal point of view: Assuming that these methods give concordant results, can we legally apply them in preference to the official? The Pharmacopœia, in its definition of the various kinds of opium, or its preparations, uses this expression: "When assayed by the process given under *Opium*." Would it be a mere case of technicality, or would the law view it in a broader light, if some other were used?

SYRUP OF WILD CHERRY, U. S. P. 1900.

By Joseph W. England.

Under the title of Prunus Virginiana, Wild Cherry Bark was first made official in the U. S. Pharmacopœia of 1840, as was also the infusion of the bark. Syrup of Wild Cherry was not recognized until the following revision (1850), and the formula adopted was based upon that of W. Procter, Jr., and J. C. Turnpenny, read at the

Pharmaceutical Meeting of the Philadelphia College of Pharmacy held February 14, 1842 (*American Journal of Pharmacy*, 1843, 27).

Procter and Turnpenny's formula consisted, briefly, in macerating and percolating, under proper conditions, 5 troy ounces of coarsely ground bark with sufficient water to measure one pint, and dissolving, by agitation, 24 troy ounces of sugar in the percolate.

In the U.S.P. of 1860 and of 1870, the same formula was followed as in 1850, with the exception that the sugar was increased to 28 troy ounces. (For the purpose of comparison, the formulas hereinafter stated are given in the usual weights and measures, and not in the official system.)

In the U.S.P. of 1880, the powdered bark (5½ avoirdupois ounces) was macerated and percolated with sufficient water to make 15 fluidounces of percolate, to which was added 28 avoirdupois ounces of sugar and 2 fluidounces of glycerin.

In the U.S.P. of 1890, further changes were made. The powdered bark (reduced in quantity to 5 avoirdupois ounces) was macerated and percolated with 4¾ fluidounces of glycerin and sufficient water to make the percolate measure, practically, 14 (exactly 13·8) fluidounces, after which the sugar (reduced in quantity to 23¼ avoirdupois ounces) was dissolved by agitation, and sufficient water added to make the finished product measure 2 pints. This process yielded a beautiful ruby-red syrup that was slightly astringent in taste, and was permanent. The use of glycerin for the purpose of preventing fermentation in the drug during the process of percolation, was first proposed by C. Schnabel (1874), a purpose it admirably serves, especially during the summer season.

In the present U.S.P. (1900) formula, the quantities of ingredients remain practically the same, but in procedure two radical changes have been made: No glycerin is used in the menstruum, and the quantity of aqueous percolate has been reduced to practically 9½ (exactly 9·6) fluidounces, instead of the 14, 15 or 16 fluidounces formerly directed.

It is obvious, if only two-thirds of the former quantity of menstruum is used, that the finished product will be considerably weaker in content of active ingredients, assuming that the larger quantity of menstruum exhausts a larger quantity of the bark; and that such is the case, is proven by the fact that the quantity of bark specified in the formula is decidedly in excess of the quantity required to

saturate the aqueous menstruum, being more than three times as much as that used in the official infusion of wild cherry (293 grains to the pint).

The aqueous percolate (which is really a cold aqueous infusion) employed in making the syrup, is a saturated solution of the water-soluble principles of wild cherry bark; and since the present U. S. P. syrup represents only a little more than 25 per cent. of aqueous percolate, and the syrups formerly official represented about 50 per cent., the marked decrease in strength can be readily seen. In addition, the reduction in strength of the formula is contrary to the experience of the framers of the previous five decennial revisions of the U. S. Pharmacopœia.

Further, the absence of glycerin in the percolating liquid is a distinct loss, as a preventive of possible fermentation in the drug during percolation. The addition of glycerin to the aqueous percolate, as directed by the present official formula, is of no service, save to give "body," and for this purpose additional sugar could have been used, and the quantity of aqueous percolate proportionately increased, with resulting advantage to the finished product.

The 1900 syrup is of an amber color and insipid taste; the 1890 syrup is of a deep ruby-red color; and while more astringent in taste, it is much more characteristic of the bark, and its astringency, especially when diluted with water, as on administration, is practically nil. The average dose of the 1900 syrup is officially stated to be one fluidrachm. This is entirely too small; the general quantity given is from 2 to 4 fluidrachms or one-half fluidounce.

Commercially, five wild cherry barks are known, as follows: The green skin, the thin, the extra thin, the thick, and the choke. The official barks have a maximum thickness of 4 mm. or 1/6 of an inch.

Syrups were made three months ago from each of these five barks, by the U. S. P. 1890 process and by the U. S. P. 1900 process, and are here shown. The syrups exhibited radical differences in physical properties, according to the process used; and in the judgment of the writer, the formula of the present U. S. Pharmacopœia is distinctly inferior to those formerly official. He would recommend the use of the formula of 1890 slightly modified, as follows:—

Wild Cherry, in No. 20 powder, 5 oz. av. (150 gm.)

Sugar, granulated, 24 oz. av. (720 gm.)

Glycerin, 4 fl. oz. (125 c.c.)

Water, a sufficient quantity to make 2 pints (1000 c.c).

Mix the glycerin with 10 fluidounces of water (300 c.c.). Moisten the wild cherry with a sufficient quantity of the liquid, and macerate for twenty-four hours in a covered vessel; then pack it firmly in a cylindrical percolator, and pour on the remainder of the menstruum. When the liquid has disappeared from the surface, follow it by water until the percolate measures 15 fluidounces (450 c.c.). Dissolve the sugar in the percolate by agitation, without heat, strain, and pour enough water through the strainer to make the product measure 2 pints (1000 c.c.). Mix thoroughly.

LONDON BOTANIC GARDENS.

By Pierre Élie Félix Perrédès, B.Sc., F.L.S.,
Pharmaceutical Chemist.

A Contribution from the Wellcome Research Laboratories, London.

(*Continued from p. 236.*)

THE WORK ACCOMPLISHED IN THE GARDEN, DURING THE ADMINISTRATION OF THE SOCIETY OF APOTHECARIES.

In the introductory chapter a summary was given of the botanical work accomplished by the Apothecaries in their garden at Chelsea, and from this we have seen that it was mainly of an educational character. The various systems of classification, for example, from that of Ray downwards, were reflected in the arrangement of the plants in the garden, and this practical application of one system or the other was preceded, as a rule, by its adoption in the lectures and demonstrations, and foreshadowed in many notable contributions to scientific literature by prominent apothecaries or by members of the garden staff. These important matters will be considered in greater detail presently, but it will be expedient, in the first place, to trace the steps by which the collections of plants were developed.

One of the earliest references to the contents of the Garden is to the effect that in 1678 a good crop of herbs for the use of the Laboratory was furnished from the garden, and it is also on record that directions were given, in the same year, to have the garden planted with the best varieties of fruit trees. In the autumn of

1682 "Dr. Herman, of Leyden, visited Chelsea Garden, and proposed an exchange of plants, which proposal Mr. Watts went to Holland to carry into effect." The system of exchange thus inaugurated became the most important factor in developing the collections at the Chelsea Garden, and from Pulteney's "Sketches" we learn that during Philip Miller's curatorship "it was the remark of foreigners, that *Chelsea* exhibited the treasures of both the *Indies*." These acquisitions of rare plants are mentioned by the Garden Committee in 1750, and credit is given to Philip Miller for his "great diligence in settling a correspondence, and procuring seeds and plants from various parts of the world." In 1771 and 1772 "a great interchange of exotic plants took place between the Society" and a number of "Noblemen, Gentlemen and others." "Her R. H. the Princess Dowager's garden at Kew" is mentioned among the contributors, and we also learn that "a bag of seeds was presented by Joseph Banks, Esq., and Dr. Solander." The influence of Philip Miller is here clearly perceptible, as Aiton who had charge of the Princess Augusta's garden at Kew was, as we have already seen, a former pupil of his, while Banks is also said to have received his early training in botany at Miller's hands. The policy so zealously pursued by Philip Miller was vigorously maintained by the Society after his death, and we accordingly find that the Demonstrator of Plants was, by the rules of 1773, "earnestly recommended" to "cultivate an extensive botanical correspondence both at home and abroad." It is evident that this recommendation bore fruit, for extensive accessions of plants and seeds from various parts of the world are recorded in 1778, 1781, 1790, 1793, and 1809. In 1815 the Court of Assistants determined "to advance" the garden "to as high a rank in the scale of exotic gardening as the . . . improved state of that science would require," and with the cooperation of William Anderson, the new gardener, steps were taken to bring about the desired result. During Lindley's tenure of office as Professor of Botany and *Præfectus Horti* the collections were doubtless maintained at a high level of excellence, although it must be confessed that details are wanting on this point. The appointment of Robert Fortune as curator in 1846 was attended with fruitful results, and the mention of his name brings us to a subject of cardinal importance in the history of the cultivation of exotic plants. Fortune, before his appointment as Curator at the Chelsea Garden,

had held the post of Botanical Collector to the Horticultural Society of London. In that capacity he had just returned to England from China, and during his three years' exploration of the latter country he had enriched the Horticultural Society's gardens at Chiswick with a large number of valuable plants. "Wardian Cases" were used by Fortune for transporting to England the living plants which he had collected in China, and to this application of Ward's discovery the great success of Fortune's mission was largely due.

Some of the services which Nathaniel Bagshaw Ward, F.R.S., rendered to the Society of Apothecaries have already been mentioned in the preceding pages. We have seen, for instance, that he held the post of Examiner for Prizes in Botany from 1836 to 1854, and that he was the prime mover in the renewal of activities at the Chelsea Garden in 1863. But Ward's scientific and administrative work was not limited to this, for he was one of the founders of the Royal Microscopical Society, established in 1840, and in 1854 he became Master of the Society of Apothecaries. During his year of office as Master he gave "on a very large scale" at the Apothecaries' Hall "two microscopical *soirées*, which have never been surpassed either there or elsewhere." His name, moreover, will always be associated with the discovery of the fact that plants which would otherwise perish in a smoky atmosphere, such as that of London, could be made to thrive if placed in "closely-glazed cases." This discovery was first made known to the world in a letter to Sir William Hooker which appeared in the "Companion to the Botanical Magazine" for May, 1836, and details of the cases and their various applications were published in 1842 in a little work of 95 pages entitled "On the Growth of Plants in Closely Glazed Cases: by N. B. Ward, F.L.S." The fourth chapter of the work "on the conveyance of plants and seeds on ship-board" is the one of most interest to us, as Ward here gives an account of several experiments in which the transport of living plants had been successfully accomplished by the use of the cases he had invented. The first of these shipments was made "in the beginning of June, 1833," when two cases filled with "ferns, grasses, etc.," were sent to Sydney, N.S.W., in the charge of Capt. Charles Mallard, R. N., with the following result:—

"SYDNEY, January 18, 1834.

"*Sir*:—I have the happiness to inform you that the plants contained in the wo glazed cases entrusted to my care, were landed here at the Botanical Gar-

den about three weeks ago, nearly the whole of them alive and flourishing. They have since been transplanted by Mr. McLean, who has charge of the garden in the absence of Mr. Cunningham (gone to New Zealand botanizing), and all are doing well.

"The complete success of your interesting experiment has been decidedly proved; and whilst offering you my congratulations upon this agreeable result, I cannot but feel some little degree of pride and pleasure in having been the instrument selected to put to the proof so important a discovery to the botanical world.

"I am, Sir, etc., etc.,

"CHARLES MALLARD."

"*To N. B. Ward, Esq.*"

It was Fortune, however, who first demonstrated on a large scale the value of the Wardian case in transporting living plants, and the revolution which this means of transport brought about is made evident in the following passage:—

"Eighteen glazed cases filled with the most beautiful plants of northern China were placed upon the poop of the ship, and we sailed [from Canton] on the 22d of December [1845]. After a long but favourable voyage, we anchored in the Thames, on the 6th of May, 1846. The plants arrived in excellent order, and were immediately conveyed to the garden of the Horticultural Society at Chiswick."[1]

As a contrast to this we have it on record that in 1819 only one plant in a thousand had survived a similar voyage under the old conditions.

In 1848 Fortune resigned the post of Curator of the Chelsea Physic Garden to enter the employ of the East India Company. His success in introducing the tea-plant into India for the Company is a matter of common knowledge, as is also Markham's feat with cinchona; and both of these achievements were only made possible by the application of Ward's discovery.[2]

After Ward's death, in 1868, the work of the garden languished owing to insufficient funds, and although Thomas Moore, the Cura-

[1] "Three years' Wanderings in the Northern Provinces of China, including a visit to the Tea, Silk, and Cotton Countries: with an account of the Agriculture and Horticulture of the Chinese, New Plants, etc., by Robert Fortune, Botanical Collector to the Horticultural Society of London." London, 1847, p. 405.

[2] For a description of the cases used by Markham see his "Peruvian Bark. A popular account of the Introduction of Chinchona cultivation into British India," London, 1880, pp. 259–265, where a short comparison is also made with those that Fortune employed.

tor, did his best and appealed to correpondents at home and abroad for donations of plants, his efforts were only partly successful. The temporary improvement effected through the exertions of Nathaniel Bagshaw Ward thus suffered a gradual decline, which ultimately resulted in the practical extinction of activities at the Chelsea Garden.

The system of sending out collectors of plants never seems to have been adopted by the Society of Apothecaries, owing probably to the expense which it entailed, but there is an entry in 1732 to the effect that "£20 per annum be paid by the Society towards the expense of sending a person to Georgia, to collect trees and plants, and to make experiments concerning raising them in England, which sum was in the following year ordered to be paid to the trustees for that colony." Now that botanic gardens have been established in all parts of the world, the system of exchange inaugurated in 1682 at the Chelsea Garden has almost entirely superseded that of sending out plant collectors, and all botanic gardens of importance issue periodically lists of seeds or of plants for exchange.

Turning now to the matters which have been referred to in the opening paragraph of this section, we shall find much to interest us; for the history of botany, and especially that of Systematic Botany, in this country, is mirrored in that of the Chelsea Physic Garden.

Systematic Botany in England may be said to have originated with John Ray (if we except Robert Morison), and the system which he elaborated in his *Historia Plantarum* marks an era in the history of botanical science.[1] Ray acknowledges as his collaborators Samuel Doody, who was associated with the early history of the Chelsea

[1] It does not fall within the limits of this paper to enter into details of the different systems of classification, but the reader will find an admirable account of the latter in Asa Gray's "Structural Botany" or Part I of "The Botanical Text Book (Sixth Edition)." New York and Chicago, 1880, pp. 331–344. This is a little masterpiece of conciseness and precision, as lucid as it is exact; but the student who is desirous of pursuing the subject further should consult the spirited but subjective account in the "History of Botany (1530–1860), by Julius von Sachs . . . Authorized translation by Henry E. F. Garnsey, M.A., revised by Isaac Bayley Balfour, M.A., M.D., F.R.S." Oxford, 1890, pp. 3—216.

Engler's system has not been adopted, to my knowledge, in any of our Botanic Gardens, so that the two above-mentioned works contain all that is necessary for our purpose. A comparison of Engler's system with that of Bentham and Hooker will be found in J. C. Willis's "Manual and Dictionary of the Flowering Plants and Ferns." Cambridge, 1897, Vol. I, pp. 133–147.

Garden, and James Petiver, the Society's first Demonstrator of Plants. It is hence reasonable to infer that his system was reflected in the arrangement of the plants in the garden and in Petiver's demonstrations, but it must be admitted that this is largely a matter of conjecture. Suffice it to say, however, that Petiver was himself a contributor to the third volume of the *Historia Plantarum*, and that he adapted his writings to that work. We find, moreover, that Samuel Dale, the learned apothecary of Braintree, adopted Ray's system in his standard work, the *Pharmacologia*. But the influence of Ray's contemporary, Tournefort, was also making itself felt, and this is perhaps indicated by the fact that Philip Miller followed a neutral course in his catalogue, published in 1730, of the officinal plants in the Garden.[1] In this small book of 152 pages the plants are divided into two sections, viz., (1) Herbs and Undershrubs; (2) Trees and Shrubs. Each section is arranged alphabetically, but copious references are given to the works of Tournefort and Ray, as well as to those of other botanists. Another catalogue covering the same ground was published in the same year by Isaac Rand, the Demonstrator of Plants.[2] The author of this

[1] *Catalogus Plantarum officinalium quae in Horto Chelseiano aluntur.* London, 1730. This contains the names of 499 plants—405 in the first section (*Herbæ et Suffrutices*) and 94 in the second (*Arbores et Frutices*). It is written in Latin, but an English name is also given to each plant.

[2] *Index Plantarum Officinalium, quas, ad Materiæ Medicæ Scientiam Promovendam, in Horto Chelseiano, Ali ac Demonstrari curavit Societas Pharmaceutica Londinensis.* London, 1730. This catalogue is little more than a duplication of Miller's work, but it contains the names of 518 plants as against Miller's 499, "and specifies the part of each used in medicine." The appearance of these two catalogues in the same year is thus explained by Martyn, in the preface to his edition of Miller's Dictionary: "Mr. Rand, then Lecturer and Demonstrator to the Company of Apothecaries in their Botanic Garden, regarded this book of Mr. Miller's as an incroachment upon his province: he therefore published in the same year, *Index Plantarum Officinalium Horti Chelseiani.*" Henry Field in his "Memoirs" omits all reference to Philip Miller's *Catalogus*, but refers to Rand's *Index* in the following terms: "1729. Mr. Isaac Rand laid before the Court of Assistants his 'Index Officinalis Horti Chelseiani;' when one thousand copies were ordered to be printed at the expense of the Society. This was a catalogue of that part of the garden which was allotted to the culture of medicinal plants, shrubs and trees, contained in the Pharmacopœia of the College of Physicians; and was designed for the use of those Apprentices, who attended the Botanical Lectures at the garden." *Per contra*, Semple, in his revision of Field's work, mentions Philip Miller's *Catalogus*, but suppresses Field's reference to Rand's *Index*. This omission is probably

work does not even go to the length of dividing his list into two sections, but he adopts the alphabetical arrangement throughout, and this non-committal attitude was also assumed in 1722 by Joseph Miller in his *Botanicum Officinale*, by Rand in his second Index (1739), and by Philip Miller in his Dictionary (from 1724 until 1759). The influence of both Ray and Tournefort is, however, clearly perceptible in these earlier editions of Philip Miller's Dictionary, that of Tournefort predominating. The old print of the garden published in 1753, and reproduced on Plate XXV,[1] throws a considerable amount of light on the disposition of the plants in the garden at that date. The arborescent plants are located together in two plots ("The Wilderness where many kinds of Trees grow"), there is a "place where the Physical Plants are placed alphabetically," the "Bulbous Rooted Flowers" have a section to themselves, the "Annual and Biennial Plants" occupy another section, and the "Perennial Plants" complete the list. Except in the case of the medicinal plants there is no indication given of the way in which these various groups are classified, but it is interesting to note that the division into arborescent and herbaceous plants is common to the systems of Ray and Tournefort, and that the "Bulbous Rooted Flowers" probably correspond to those of the twenty-first book of Ray's *Historia Plantarum*, "*qui est De Herbis radice bulbosa donatis iisque affinibus*." The section devoted to medicinal plants also suggests several points of interest. We find, in the first place, that this collection, which was by far the largest one at the beginning of the eighteenth century, now forms but a relatively small part of the varied contents of the garden, and we also perceive that the alphabetical arrangement which had commended

due to a confusion of the *Index* with a later catalogue by Rand entitled *Horti Medici Chelseiani Index Compendiarius* [etc.], and published in 1739; for the author (Semple), in his description of the *latter* work, states that "it would appear from some pages in the biography of Mr. Philip Miller, that Mr. Rand prepared this Index in consequence of his feeling hurt at the publication of the Catalogue of the contents of the Garden by the former, who, as Mr. Rand considered, had encroached upon his province, he being the Præfectus Horti and Botanical Demonstrator while Mr. Miller was the Gardener." The confusion has doubtless arisen from the fact that the original "Memoirs" by Henry Field are silent on the subject of Rand's *second* catalogue.

[1] I am indebted to Mr. H. Howard Batten, the clerk to the Trustees of the Chelsea Physic Garden, for the loan of the block from which this plate was printed.

itself to the demonstrators, Isaac Rand and Joseph Miller, in their writings, has been applied to the living plants themselves.

In 1736 Linné visited the garden, and cordial relations were established between the illustrious Swedish botanist and the *personnel* of the Chelsea Physic Garden. These relations were maintained through the medium of correspondence during succeeding years, with the result that the Linnean or "sexual" system found among the members of the Chelsea Garden staff some of its earliest exponents in this country. William Hudson, an active member of the Garden Committee, who subsequently held the post of Demonstrator of Plants and *Præfectus Horti* from 1765 to 1771, was one of the earliest Linnean botanists in England, and he is even stated to have been the first author in this country who embraced the Linnean system. This statement, however, is perhaps not quite accurate, and it must not be forgotten that Benjamin Stillingfleet and James Lee, not to mention Philip Miller, had preceded Hudson in the *publication* of Linnean literature. In this connection the following estimate by Pulteney [1] is probably not far from the truth:

"By all these preliminary advances,[2] the learned were prepared to see the *English* botany modelled according to the rules of the *Linnæan* school. Dr. HILL seized the first opportunity of attempting it, in his *Flora Britannica*, 1760; but it was executed in a manner so unworthy of his abilities that his work can have no claim to the merit of having answered the occasion: and thus the credit of the atchievement fell to the lot of Mr. William HUDSON, F.R.S., who, to an extensive knowledge of *English* plants, acquired by an attention to nature, had, by his residence in the *British Museum*, all the auxiliary resources that could favor his design: access particularly to the Herbaria of almost all the assistants of RAY and DILLENIUS,[3] mentioned in the *Synopsis*,[4] gave him the opportunity of comparing the individual specimens of

[1] *Loc. cit.*, Vol. II, pp. 351-352.

[2] The "preliminary advances" mentioned by Pulteney comprise: (1) References to the writings of Linné in Martyn's *Virgil* (1740), in Dillenius's *Historia Muscorum* (1741), in Blackstone's *Specimen Botanicum* (1746), and in the "Philosophical Transactions;" (2) the arrangement of "all the plants of RAY'S *Synopsis*, according to the system of his master," by "a *Swedish* pupil of the *Upsal* school" (1754); (3) Browne's adoption of the Linnean system for classifying "his *Jamaica* plants" (1756); (4) Stillingfleet's "Translations of several tracts from the *Amœnitates*" (1759), and Lee's "Translation of the *Elements* of the Sexual System" (1760); and (5) Solander's arrival "into England on the 1st of July, 1760."

[3] Dillenius was the first Sherardian Professor of Botany at Oxford.

[4] The first edition of Ray's *Synopsis Stirpium Britannicarum* was published in 1690. The third edition, by Dillenius, was issued in 1724.

that work with his own; and thus enabled him to dispel a multitude of doubts and uncertainties, in which, otherwise, his application of the *synonyma* might have been involved."

Even the venerable Philip Miller became converted to the Linnean doctrine, and the process of conversion is made apparent in the edition of 1759 of his dictionary, where the system of Linné is given a place. Miller, however, was at first reluctant to abandon the systems of Ray and Tournefort, to which he had been accustomed throughout his working life, but he was ultimately weaned from them completely, and we find him publishing, in his seventieth year, a "Short Introduction to the Knowledge of the Science of Botany, Explaining the Terms of Art Made Use of in the Linnæan System" (London, 1760). In the eighth edition of his dictionary (London, 1768), which was the last published in his lifetime, the Linnean system only was recognized, but the alphabetical arrangement was still preserved. Once adopted, the "sexual" system of Linné swept all before it, and for a period of sixty years the Chelsea Physic Garden became one of its impregnable strongholds. William Curtis, the author of the *Flora Londinensis* and of the "Botanical Magazine," who was Demonstrator of Plants from 1773 to 1777, was one of its most able exponents, as evidenced by his educational works: "Linnæus's System of Botany, so far as relates to his Classes and Orders of Plants" (London, 1777), which was "drawn up for the use of his pupils," and "Lectures on Botany as delivered in the Botanic Garden at Lambeth," published posthumously in 1805. Thomas Wheeler, his successor, was a staunch adherent of Linné to the last and a fierce antagonist of the "natural" system promulgated by Jussieu in 1789. During his term of office the whole of the collections were arranged according to the "sexual" system, but the medicinal plants were still kept apart from the general collection.

The first attempt to introduce the natural system into the garden was made in 1821, when the Demonstrator was requested to employ some time at each demonstration "in explaining to the Students the systems of Botany, both Sexual and Natural, as taught by Linnæus and Jussieu." When the scope of the lectures in the garden was extended in 1830, it was again specified that "the different systems of Botany, both natural and artificial, particularly those of Linnæus and Jussieu," should form a part of the course. The *Catalogus Rationalis Plantarum Medicinalium, in horto Societatis Pharmaceuticæ*

Londinensis, apud vicum Chelsea, cultarum, published by James Lowe Wheeler in 1830, affords evidence that these instructions were carried into effect. The author in that work adopted the system of Linné in the main text, but this was supplemented by a *Synopsis Plantarum Medicinalium, secundum Systema, D. Jussieu, dispositarum,* and the class and order of Jussieu's *Genera Plantarum,* as well as Linné's *Ordo Naturalis,* were, moreover, mentioned under each genus in the portion classified according to the "sexual" system. The arrangement of the plants in the garden, however, seems to have undergone no change until the advent of Lindley, for Anderson, the gardener, was stubbornly attached to the Linnean creed, and refused to adopt any other. But when Lindley came upon the scene Anderson was forced to give way, and Lindley's system was gradually introduced. It is, nevertheless, interesting to note that Lindley himself realized that his system left much to be desired, and he ultimately almost abandoned it in his lectures. He saw clearly that all attempts to arrange a natural system in a consecutive series of natural orders must result in a series of compromises, and he therefore preferred to deal with the orders in natural groups which he termed *Nixus* or Tendencies, and Cohorts or Alliances. This attitude is curiously reflected in his *Flora Medica,* published in 1838. In the preface to that work he says: "In the present state of systematical Botany no two writers upon classification can agree respecting the exact sequence in which the natural orders of plants should follow each other. By some the plan of Jussieu is adopted, by others that of De Candolle, and by many the systems of Endlicher, of the author of this work, of Von Martius, of Schultz, or even of Reichenbach, may be preferred. This can only be accounted for upon the supposition that the systems of all these authors are equally false." As a result, and in order "to enable the reader of this book to suit his own convenience in the arrangement of the matter, the work is so printed that the different natural orders may be cut asunder and re-arranged at the pleasure of the possessor."

The rearrangement of the plants in the garden was considerably delayed owing to the persistent hostility of Anderson to Lindley's wishes, but the Professor of Botany was equally insistent on having these complied with, so that pressure was brought to bear on Anderson with the result that a new arrangement of the medicinal plants was, so far as possible, completed in 1839, and, in 1847, the

entire collections were rearranged by Fortune under Lindley's direction. The system of Decandolle was subsequently applied to a part of the collections, but we have no precise information as to when this took place. From the description given of the garden by Semple in 1878 we learn that both Decandolle's and Lindley's systems were at that date represented in the plantations of medicinal plants, the older and less important plantation being that arranged according to the system of Lindley. The portion to the south of the centre path which crosses the garden from the students' entrance in Swan Walk to the opposite side was occupied, as at present, by beds of hardy herbaceous plants, and the plants in this section of the garden were arranged in Decandollean orders, but the latter were not placed in sequence. Near the centre of the garden there was a span-roofed house divided into "stove" and greenhouse, and devoted to medicinal plants. No alteration in these arrangements appears to have been made until the garden changed hands, and Mr. Hales, the present Curator, informs me that, when he took over the collections, these, although much deteriorated, were substantially the same as in 1878.

[*To be continued.*]

PROGRESS IN PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE MORE INTERESTING LITERATURE RELATING TO PHARMACY.

By M. I. Wilbert,
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The earthquake and the succeeding conflagration that virtually destroyed the city of San Francisco on April 18, 1906, has been for weeks the one topic that is foremost in the minds of men in all parts of the civilized world.

Among the numerous thousands of the citizens of San Francisco who have been rendered homeless and practically penniless, there are no less than 200 pharmacists and upwards of 800 physicians.

While liberal donations from all sections of the United States have provided for the immediate needs of the homeless, so far as food and temporary shelter are concerned, many, if not all, of the pharmacists and physicians will be practically compelled to begin

life anew, and to live under conditions that are far from promising or encouraging.

Recognizing the coming needs of the retail pharmacists of San Francisco, the Executive Committee of the National Association of Retail Druggists has shown commendable energy in making preparations to raise a fund of $100,000 or more, to assist these destitute fellow-members of our craft to renew business at an early date.

The American Medical Association has instituted a similar fund for relieving the physicians of San Francisco and the surrounding towns who have been made destitute, and it is but reasonable to expect that every fair-minded pharmacist will contribute what he can, at a very early date, to either the one or the other, or perhaps both, of these funds.

Patent and Proprietary Medicines continue to have difficulty in maintaining their prestige.

While it is true that practically all of the so-called "formula on the label bills" have been disposed of in a manner agreeable to the members of the Proprietary Association of America, it is also true that the feeling that something should be done to compel publicity in connection with fakes and frauds, is constantly growing, and that it will be but a matter of time when full and complete formulas will be considered necessary in connection with all proprietary medicines.

New Dutch Pharmacopœia.—The fourth edition of the "Nederlandsche Pharmacopee" has been published and becomes official from the 1st of July, 1906.

The book is published both in the Dutch and Latin languages and is the official text for Holland as well as all of the Dutch Colonies.

The appendix contains several novel innovations, one of them, a chapter on first aid to the injured, and another a dissertation on the antidotes for the more common poisons. In common with the Austrian and other European Pharmacopœias, the atomic weight table is based on O = 16.

The formulas recommended by the International Conference for the unification of the formulæ of potent medicaments have been generally adopted and are designated throughout the book by the addition of F. I., evidently intended to designate them as "Formula Internationalis."

The Pharmacopœia contains 652 official medicaments, of which

210 are designated as being essential and must therefore be found in all of the apothecary shops.

The tests that are included are numerous and varied; they include among others the determination of the melting point, boiling point and congealing point of many substances, the iodine and the saponification numbers of fatty oils, extensive tests for ethereal oils, and the microscopic examination of powdered drugs.

In the matter of making preparations it is interesting to note that aromatic waters are to be made by distillation. Aqueous extracts are to be prepared by maceration or infusion and alcoholic extracts by percolation. (*Phar. Zeitg.*, 1906.)

The French Military Pharmacists.—The French Army now has 115 military pharmacists, consisting of 1 inspector, 4 principals of the first class, 5 principals of the second class, 30 majors of the first class, 45 majors of the second class, 20 aide majors of the first class, 10 aide majors of the second class. These rank respectively as second lieutenant, first lieutenant, captain, major, lieutenant-colonel, colonel, and major-general.

Up to and including pharmacist-major of the first class, advancement is primarily by length of service plus merit, while for the higher grade selection by merit is given the preference. (*Apothek. Zeitg.*, 1906, 217.)

Aromatic Waters.—In a recent number of the *Pharmaceutical Journal* (1906, page 344), W. S. Glass repeats a suggestion he had previously made to make the official aromatic waters by dissolving the respective oils by agitation with hot distilled water, in the proportion of 2 c.c. to 1000 c.c. of distilled water, and filtering, when cold, through a double well-wetted filtering paper.

For rose and neroli half the quantity of the oil is said to secure a saturated solution.

Detection of Small Traces of Copper in Distilled Water.—Add 1 or 2 drops of ammonia to 500 c.c. of the suspected water and filter it three or four times through a plug of cotton wool. A faint green color of the cotton wool indicates the presence of copper in quantities too small to be detected by sulphuretted hydrogen or potassium ferrocyanide. (*Phar. Jour.*, 1906, p. 387, from *Apoth. Zeitg.*)

Non-combustible Celluloid.—According to a recently issued English patent the addition of boric acid to celluloid, in process of manufacture, will materially reduce the danger from fire. The description

of a mixture of this kind embodied in the patent application consists of 4 parts nitrocellulose, 2 parts camphor and 3 parts boric acid. (*Chem. Zeitg.*, 1906, page 178.)

Atomic Weights.—The International Commission for the determination of corrections in the atomic weights of elements, has adopted the following modifications based on the standard of O = 16, the only one now recognized by the Commission.

Antimony, Sb	120·2
Calcium, Ca	40·1
Iron, Fe	55·9
Iodine, I	126·97
Mercury, Hg	200·00
Tin, Sn	119·00

(*Phar. Zeitg.*, 1906, page 191.)

Toxic Symptoms following Use of B-Eucain.—J. Kraus reports that almost immediately after the injection of 10 c.c. of a 2 per cent. solution of B-Eucain into the urethra the patient experienced a high degree of irritability, dyspnea, cramp-like contractions, paralysis of speech, etc., that continued for upwards of one and a half hours. Faradization and inhalation of oxygen improved the condition gradually. (*Phar. Zeitg.*, 1906, page 192, from *Deut. Med. Woch.-Schr.*)

Poisoning by Stovain.—Trautenroth reports that after the injection of 0·06 gramme of stovain, which produced the desired analgesia, the patient manifested dyspnea and choking, which gradually disappeared. Several days later the patient complained of severe headache and a marked inflammation of the terminal nerves of the scalp. These symptoms disappeared more slowly. (*Phar. Zeitg.*, 1906, page 192, from *D. Med. Wochschr.*)

Benzosalin.—Methylester of Benzoyl salicylic acid to be used in place of the now popular acetyl-salicylic acid. Benzosalin is insoluble in water but soluble in alcohol or ether; melts at 82° C., and is practically tasteless. Said to be useful in rheumatism, neuralgia, etc. Dose, 1 gramme four times a day. (*Zeitschr. D. A. öst. Apothek. Ver.*, 1906, page 110.)

Flutol is described as Fluorbrom phenyl-bismuth, which is said to be useful as an antiseptic. (*Phar. Zeitg.*, 1906, page 192.)

Gaultherine is said to be Sodium-methyl salicylate, it is only slightly soluble in water but freely soluble in alcohol. It has been

suggested as an efficient antiseptic and antiferment. Dose, 0·3 to 0·6 gramme. (*Phar. Centh.*, 1906, page 240.)

Jasmiflorin.—A crystallizable glucoside prepared by Vintelesco from the green twigs of Jasminum indiflorum. It is levogyrate and decomposed by emulsin and also by boiling with dilute mineral acid. (*Jour. Phar. et de Chem.*, 1906, page 305.)

Kolatine.—An alkaloid from fresh kola nut, is said to be quite distinct from the kolamine of Knebel. Kolatine occurs as prismatic needles, melts at 150° C., is fairly soluble in water, more readily soluble in alcohol, acetone and ether, but almost insoluble in chloroform. The pharmacologic investigation of kolatine is now being carried out. (*Phar. Jour.*, 1906, page 261, from *Bull. Com.*)

Salene is an oily liquid consisting of a mixture of methyl and ethyl glycol salicylates. It is employed as an external application diluted with alcohol or with castor oil, in painful rheumatic affections.

Salene is only sparingly soluble in olive oil but is more readily soluble in castor oil or in alcohol, and is directed to be diluted with equal parts of castor oil or of alcohol for external use.

Taxicatin.—Lefebre has isolated a crystallizable glucoside from the fresh leaves of Taxus baccata which he calls Taxicatin. Taxicatin melts at 165° C., is levogyrate, and is decomposed by emulsin. Fuming nitric acid produces with this glucoside a blue color, differing from Picrin and Congerin which do not show this reaction. (*Jour. de Phar. et de Chem.*, 1906, page 304.)

Thiobromose or *Thiobrominlithium* is theobromin in which one atom of hydrogen has been replaced by one atom of lithium.

It occurs as fine silky needle-shaped crystals that are freely soluble in water; the solution, however, is unstable and, on long standing, the solution is gradually decomposed into lithium carbonate and theobromin. (*Phar. Centh.*, 1906, page 304.)

Vesipyrin.—Acetyl-salicylic-acid-phenyl ether or acetyl-salol is a crystalline substance that is insoluble in water but readily soluble in alcohol. It is said to be produced by the direct combination of molecular quantities of its constituents.

Said to be useful in cases of articular rheumatism, influenza, inflammation of the kidneys and cystitis, etc.

Vesipyrin may be given in doses of 1 gramme three or four times a day. (*Phar. Centh.*, 1906, page 130.)

THE PROCTER MEMORIAL.

If any one should feel doubtful about the success of the Procter Monument let him be assured that the idea of the monument did not spring up in a day, but that it is the result of discussion and thought, and that it is already firmly fixed in the minds of a large number of American pharmacists. As stated by Professor Hallberg in the May number of the *Bulletin of the American Pharmaceutical Association*, the monument is an assured fact.

It now remains to set about collecting the funds in a systematic manner, and in order that this part of the work may not drag over too long a period, it is urged that every pharmaceutical organization in the country, including the State pharmaceutical associations, the colleges and schools of pharmacy, local pharmaceutical associations, the National Association of Wholesale Druggists and the National Association of Retail Druggists, appoint committees for collecting funds from their respective members. It is hoped that by such concerted action the Committee on Procter Monument will be able to make a report at the meeting of the American Pharmaceutical Association at Indianapolis in September, which will reflect credit not only on the organizations named, but which will likewise stand to the credit of the individual members of the pharmaceutical calling in America.

The following circular letter has been issued by the Committee:—

TO THE PHARMACISTS AND DRUGGISTS OF AMERICA AND WHOMSOEVER ELSE THIS MAY INTEREST.

Greeting:—At the annual meeting of the American Pharmaceutical Association in 1899—after the reading of the report of the Committee on the Semi-Centennial Celebration, Albert E. Ebert, of Chicago, made the following remarks: "If that committee is to be continued, I would like to draw their attention to one feature. One of the founders of this Association, and the father of American Pharmacy, William Procter, Jr., is seemingly forgotten. It seems to me, without saying anything against the other men who have lived and worked for the advancement of pharmacy and this association, that it is possible for this association at the time of our fiftieth anniversary to do something to commemorate his valuable work; it would be a grand thing for the association. There has been no

man associated with this organization who has done so much, who has been such a faithful servant of this association in times gone by, who cared for it to the extent that William Procter did; I hope when we meet in Philadelphia in 1902, that something will be done to commemorate the grand work William Procter, Jr., has done for this association and American pharmacy."

At the next meeting held at Richmond, Va., in 1900, Prof. Joseph P. Remington read an interesting memorial address on the life of William Procter, Jr. This was published in the proceedings of that year.

Since that time the reminiscences of personal friends and various recommendations of pharmacists, teachers, and editors, have been published in pages of the AMERICAN JOURNAL OF PHARMACY, and other pharmaceutical periodicals.

In 1901 President John F. Patton in his address to the American Pharmaceutical Association, referred to the remarks of Mr. Ebert, made at the meeting in 1899; and subsequently his successor, President H. M. Whelpley, appointed a committee on the William Procter, Jr., fund. This committee made a report at the semi-centennial meeting in Philadelphia in 1902, in which they recommended that the life membership fund be changed to the William Procter, Jr., fund. Other recommendations were made, and a resolution was passed to hold the fund in reserve until it shall have reached $25,000. After this report, John F. Hancock made some remarks recommending the erection of a monument at the National Capital, as a memorial to Professor Procter; and at the Jubilee session A. E. Ebert read a memorial sketch of the late Professor Procter.

At the 1903 meeting of the American Pharmaceutical Association the William Procter, Jr., Fund Committee made a report in favor of not using any of the fund until $25,000 shall have been collected. At this meeting John F. Hancock presented a paper advocating a memorial monument, and at the meeting in 1904 Mr. Hancock presented another paper in favor of this monument and offered the following preambles and resolutions which were adopted:

WHEREAS, The American Pharmaceutical Association from its inception has enrolled as members the most reputable and accomplished pharmacists and druggists in America, who by the character of their annual contributions have made it an ideal organization, and

WHEREAS, One of its founders, the late Prof. William Procter, Jr., became its most distinguished and honored member, through his untiring energy, ability, and valued services to the close of his life.

Therefore, be it *Resolved*, That a Committee of five be appointed by the President, said committee to be known as the Committee on the Wm. Procter, Jr., Monument Fund, whose business it shall be to solicit subscriptions for a memorial monument.

Resolved, That when a sufficient amount shall be collected by subscriptions, this Association shall authorize and have erected in the Smithsonian Grounds in Washington, D.C., a bronze monument, commemorative of the late Wm. Procter, Jr., "The Father of American Pharmacy."

Resolved, That the committee be authorized to invite the co-operation of the various State Pharmaceutical Associations, and all other bodies and individuals in sympathy with the undertaking, and that credit be given to each subscriber.

Resolved, That the American Pharmaceutical Association shall be the custodian of all funds collected, and shall disburse the same for the object herein named, under such rules and regulations as may be adopted.

Wm. Procter, Jr., was the ninth and youngest child of Isaac and Rebecca Procter. He was born in the City of Baltimore, Md., on the 3d of May, 1817. His paternal ancestor had come from England in 1793, and engaged in the hardware business in Baltimore. He died from yellow fever, three years after the birth of William. When the estate was settled, there was very little money left for his widow to support and educate her children. William, however, possessed industrious and studious habits with accurate observation and good memory, and from his early youth he economized his leisure hours in the pursuit of knowledge. At the age of 14 he engaged himself to Henry M. Zollickoffer, a reputable pharmacist of Philadelphia, Pa., under whose influences, and aided by the solicitude and directions of an educated and good mother, his intuitive mind sought associations that developed a strong character for usefulness.

In 1837 he was graduated from the Philadelphia College of Pharmacy, but remained with Mr. Zollickoffer as assistant and clerk until 1844, when he purchased the property at the S. W. corner of Ninth

and Lombard Streets, and continued in business on these premises until his death in 1874.

In 1840 he was elected a member of his alma mater, and soon became active and influential. His thought and ambition was liberally bestowed on the advancement of pharmacy, and his example in practice was to make it a profession. In 1846 the Chair of Theoretical and Practical Pharmacy was established by the Board of Trustees, and William Procter, Jr., was the only one considered for the position. He was the one member of the college who was preeminently qualified to teach, and by unanimous vote was the first pharmacist elected to a professorship in the oldest college of pharmacy in America. He soon established for himself a character and reputation as a thoroughly qualified teacher.

In October, 1847, he delivered a very interesting and instructive introductory address to his class, which was published in the AMERICAN JOURNAL OF PHARMACY of that year. In 1846 he was elected associate editor of the AMERICAN JOURNAL OF PHARMACY, and in 1850, when Professor Carson resigned the editorship, he was elected to succeed him, being the first pharmacist in America that was elected to the editorship of a pharmaceutical journal. He filled this position with great ability, and made the JOURNAL of practical value to pharmacists and druggists. For twenty years this JOURNAL was under the editorial management of Professor Procter, and its pages proclaim the value of his work to pharmacists. Its general index gives more than seven columns, and about five hundred and fifty items, under his name, exclusive of abstracts from foreign journals and editorials, greatly more than any other contributor, and all of much scientific and practical value. No man of his time could have been more interested in the promotion of pharmacy, and surely no one more qualified.

In 1849 he was the American Editor of Mohr and Redwood's "Practical Pharmacy," which was enlarged by important additions from his pen. In 1851 there was a convention held in New York pursuant to an invitation of the New York College of Pharmacy, the chief object of which was to consult on the questions of standards for the inspection of drugs at the several ports of entry. Important business was transacted at this meeting, and Prof. William Procter, Jr., was the most active delegate in attendance, and in giving shape to the organization. The convention adjourned to meet in Phila-

delphia the following year. In the time that intervened, the mind and pen of Procter were busy making preparations and formulating plans for more perfect organization, and at the meeting he was thoroughly prepared for business, and it was doubtless his thought that brought the American Pharmaceutical Association into active existence. After its organization he was always ready to render assistance, and was the most important factor in its development. No member has ever shown more loyalty and devotion to its service.

He has been the only member who was present at all of the Annual Meetings up to the time of his death, excepting the one that met in 1867 when he was a delegate to the International Pharmaceutical Congress which met in Paris, and the history of his life was largely the history of the organization and the early progress of the American Pharmaceutical Association.

Space will not allow all that might be said in favor of Prof. William Procter, Jr., the peer of American Pharmacists. A review of the pages of the AMERICAN JOURNAL OF PHARMACY, and the proceedings of the American Pharmaceutical Association will more fully express the value of his life-work, and its influence on the higher aims of his chosen profession, which he did so much to honor and extend. His influence for good was not confined to the pharmaceutical guild, but directly and indirectly the profession of medicine was substantially aided in the humane endeavor to cure diseases. He was in no sense a selfish man, and his heart went out to all in sympathy and kindness, but not in a demonstrative manner. What he knew he was ready and willing to impart to others.

In his letter of resignation as editor of the AMERICAN JOURNAL OF PHARMACY presented at a meeting of the Philadelphia College of Pharmacy, December 27, 1870, he states: "It is now thirty-four years since my connection with the AMERICAN JOURNAL OF PHARMACY as a contributor commenced, and about twenty-five years as co-editor and editor. During this period, time and labor have been freely given to make the work a continuous record of the progress of pharmacy at home and abroad. For many years it was a labor of love, and despite the great sacrifices of time occasioned by contributing to its pages the labor was cheerfully given. I need hardly say that it has required an effort on my part to thus voluntarily resign a position fraught with so many pleasant memories."

In an article entitled Pharmaceutical Titles, he writes: "If their possession carried with it the knowledge and dignity which sometimes it is presumed to represent, then titles might well be sought for as desirable evidences of accomplished work. Unfortunately, in many instances there is no relationship."

He had conferred upon him the complimentary title of Doctor of Pharmacy, which he gracefully accepted, but never paraded; his aim was rather to acquire useful knowledge, but he was not a seeker after the titles which he regarded as often misleading. He was devoted to young men who were in search of knowledge, and at the last meeting that he attended of the American Pharmaceutical Association a few months before his death, he read a paper, "Suggestion to Beginners," which illustrates the fact of his continued interest in pharmaceutical students.

William Procter, Jr., has been and ever will be regarded as the ideal representative of American Pharmacy, in the highest sense of public service. His colleagues, the medical profession and the public, owe to his memory a debt of gratitude.

This, we believe, is a matter in which everyone connected with pharmacy should and will take an interest. It is the first attempt made in America to so honor a member of the pharmaceutical fraternity, and the co-operation of all is invited, that the undertaking may prove not only a success, but in order that pharmacists may show to the world that there are those among them worthy of the highest esteem, and that they themselves duly appreciate and honor the leaders in their ranks.

That each may feel a personal interest, it is the purpose of the undersigned Committee to solicit direct or through the auxiliary Committees of the State Pharmaceutical Associations, *individual* subscriptions from every pharmacist and druggist in America, retail, wholesale, and manufacturing, and all others who feel an interest in the elevation and good character of pharmaceutical practice, which Professor Procter did so much to establish. It is earnestly suggested that each pharmacist who subscribes to the Memorial Fund should feel that what he gives represents but a fraction of the benefits conferred by the life work of Professor Procter on every student of Pharmacy in America.

Due acknowledgment will be made to each person on the payment of their subscription as a token of their interest.

John F. Hancock, Chairman, 4 South Howard Street, Baltimore, Md.

Benjamin T. Fairchild, Fairchild Brothers & Foster, New York, N. Y.

Henry Kraemer, 424 South Forty-fourth Street, Philadelphia, Pa.

Frank C. Henry, 703 Fifteenth Street, N. W., Washington, D. C.

C. S. N. Hallberg, N. W. cor. Michigan Blvd. and Twelfth Street, Chicago, Ill.

BOOK REVIEWS.

SQUIBB'S MATERIA MEDICA. 1906 Edition. Published annually by E. R. Squibb & Sons, 78–80 Beekman Street, New York.

In this volume of nearly 400 pages is an alphabetical list of all the Squibb products, embracing the articles in the U. S. Pharmacopœia (Eighth Revision) and the National Formulary, together with the non-official chemicals, pharmaceuticals and newer remedies in general use, setting forth their origin, Latin and English titles, synonyms, physical and chemical characteristics, incompatibilities, antidotes, therapeutic indications, doses, etc. In Part II is also given a list of cultures of bacteria, culture media, staining solutions, tables of equivalents of the metric system in avoirdupois and apothecaries' weights and measures, percentage solutions, and glossary of therapeutic terms.

The book contains a large amount of valuable information and will be found useful to both physicians and pharmacists.

PHILADELPHIA BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The second stated meeting of the Philadelphia Branch of the American Pharmaceutical Association was held on the evening of Tuesday, April 24, 1906, the first vice-president, Mr. William McIntyre, presiding.

The discussion on "The immediate object and the aims of the Philadelphia Branch of the American Pharmaceutical Association" was opened by Mr. Joseph L. Lemberger, of Lebanon, the president of the American Pharmaceutical Association. Mr. Lemberger

spoke on the suggestion "To foster fraternal relations between members of the pharmaceutical profession." In this connection Mr. Lemberger referred to the imperative need for association and expressed the opinion that the development of the idea of local branches of the American Pharmaceutical Association will have a tendency to bring local pharmacists together to discuss matters relating to the professional side of their calling and will, in turn, serve to impress physicians with the abilities and accomplishments of the younger generation of pharmacists.

Mr. William L. Cliffe, in support of his suggestion "To endorse and to assist in the present movement for higher educational requirements for pharmacists," said that in his capacity as a member of the State Board of Pharmacy he deeply felt that the education of the pharmacist had not progressed in the same ratio as the need for education. The demand for increasing the educational qualifications of prospective pharmacists was, therefore, an imperative one and one that should be recognized and provided for.

Mr. Franklin M. Apple, the next speaker, suggested that it would be desirable to co-operate with physicians to prevent the indiscriminate renewal of prescriptions. This practice he believed had been productive of much misunderstanding and had no doubt led to abuses that should be corrected.

Mr. O. W. Osterlund suggested the cultivation of friendly relations between physicians and pharmacists and expressed the opinion that in the greater number of instances suggestions and corrections would be kindly received by physicians and would, in turn, serve to impress on the latter a recognition of the need of practical assistance and advice.

Mr. John K. Thum expressed the belief that the most desirable way of promoting the welfare of the average pharmacist would be found in fostering and developing the professional side of pharmacy. This, he asserted, could be best accomplished by securing the co-operation of all reputable pharmacists to work together for the common good.

Additional suggestions were made by Messrs. England, Peacock, Hunsberger, Dr. Weidemann and Professor Kraemer.

Professor Kraemer suggested the advisability of giving publicity to the deliberations of the local branch and of taking an active interest in matters of public concern that might in any way improve

the professional standing of members of the pharmaceutical profession. In this connection he called attention to the need for endorsing and assisting the Council on Pharmacy and Chemistry of the American Medical Association.

The several suggestions that had been made in the course of the evening, with some additional ones that had been offered in writing, were referred to a committee of three to report at the next meeting.

The next meeting of the Philadelphia Section of the American Pharmaceutical Association will probably be held on the evening of Monday, May 21, 1906, in the Hall of the College of Physicians.

M. I. WILBERT, *Secretary.*

PHILADELPHIA COLLEGE OF PHARMACY.

THE EIGHTY-FIFTH ANNUAL COMMENCEMENT.

The eighty-fifth annual commencement of the Philadelphia College of Pharmacy was held in the American Academy of Music, corner of Broad and Locust Streets, Thursday evening, May 17th. After prayer by the Rev. Edwin Heyl Delk, D.D., the degrees were conferred by the president of the college, Howard B. French.

The following are the names of those receiving the degree of Doctor in Pharmacy (P.D.), together with the subjects of their theses:

Name.	*Thesis.*	*State or Country*
Albert, Henry Clay, P. C.,	Lime Water and Lime Water Tablets,	New Jersey
Allen, John Harvey,	Glyceritum Boroglycerini,	Delaware
Anawalt, Robert Bunn,	The Soda Fountain,	Pennsylvania
Andrews, Joseph Colson,	The Marvels of Coal Tar,	New Jersey
Ayres, Wilmot,	The Pharmacist and His Specialties,	Pennsylvania
Baskin, Ancy Lonza,	The Art of Making Compressed Tablets,	South Carolina
Bell, Frances Rose,	Brown Mixture,	Pennsylvania
Bender, William Lawrence,	Cod Liver Oil,	Pennsylvania
Betts, John Alvin,	Hydrastis,	Delaware
Bienkowski, Peter Thomas,	Spiritus Ammoniæ Aromaticus,	Pennsylvania
Blinzig, Frederick John,	Liquor Magnesii Citratis,	Pennsylvania
Bragdon, Clarence Eugene,	The Paper Industry,	Maine
Brubaker, Elam,	Oleum Theobromatis,	Pennsylvania
Burgoon, William David,	Formaldehyde,	Pennsylvania
Burns, Helen Ritz,	A Pessimistic *vs.* An Optimistic View of Pharmacy,	Pennsylvania
Butler, Samuel Sumter,	Fluid Extracts,	New Jersey

Name.	*Thesis.*	*State or Country.*
Butter, Franklin Alfred,	Sodii Boras and Acidum Boricum,	California
Carl, Frank William,	Hydrastis and Its Cultivation,	Pennsylvania
Cheney, Frank Lester,	Extemporaneous Sulphurous Acid,	Vermont
Coles, Clawson Samuel,	India Rubber: Its Origin and Preparations,	New Jersey
Cook, Elliott Daniel,	Shall the Drug Store Close on Sunday?	New Jersey
Crouse, George Francis,	Sodii Sulphis. Sodii Bi-sulphis,	Pennsylvania
Cunningham, Milton Hart,	Cod Liver Oil,	New Jersey
Davy, George Covell,	Water,	Pennsylvania
Dawson, John Douglas,	Disinfection,	Illinois
DuBois, George Stanley,	Magnesii Carbonas,	Kentucky
Eadie, Erma Delia,	Cascara Sagrada,	Pennsylvania
Earl, Franklin Wallace,	The Aromatic Medicated Waters, U.S.P.,	New Jersey
Eckenroth, Charles Wm.,	Acidum Tannicum,	Pennsylvania
Evans, Charles Wilson,	India Rubber: Its Origin and Preparations.	Pennsylvania
Fahr, Harry Miller,	Suppositories,	Pennsylvania
Feigley, Harvey Peter,	Magnesium Sulphate,	Pennsylvania
Fernandez, Manuel,	History of the Zinc Industry,	Cuba
Flack, Herbert Lewis,	Cataplasma Kaolini,	Maryland
Fogg, Frank Carroll,	Tablet Manufacture,	New Jersey
Fogg, Frank Garfield,	Mercurial Ointment,	New Jersey
Forrest, Ralph Anderson,	The European Source of Drugs,	New Hampshire
Foster, Wm. Wetheral, Jr.,	Suppositories,	Pennsylvania
Goodyear, Wilbur Bair,	Tinctura Cardamomi Composita,	Pennsylvania
Goss, Lloyd Earl,	Sodium Phosphate,	Pennsylvania
Grammer, Charles Roy,	Kaolin,	Pennsylvania
Green, Francis,	Asbestos,	New Jersey
Greyer, Charles Peyton,	Jalapa,	Virginia
Grim, Herman Charles,	Strophanthus Kombe,	Pennsylvania
Haley, George Benjamin,	Tem-Piah-Ute,	Idaho
Hancock, Godfrey Olin,	Ferri Carbonas Saccharatus,	New Jersey
Haws, James William,	Hydrargyrum,	Pennsylvania
Henry Harvey Abner,	Zea Mays,	Pennsylvania
Herr, Jason Adam,	Use of Glycerin in Pharmaceutical Preparations,	Pennsylvania
Hoenstine, John Calvin,	Glyceritum Phenolis,	Pennsylvania
Hoffman, Wm. Christopher,	Cannabis Indica,	New Jersey
Hughes, Harry Caswell,	Elixir Ferri Quininæ et Strychninæ Phosphatum,	Pennsylvania
Hurst, Benjamin Russell,	Liquor Magnesii Citratis,	Pennsylvania
Irvin, Samuel Miles,	Mercury,	Pennsylvania
Irwin, James Franklin,	Aqua Acidi Carbonici,	Pennsylvania
Jenkins, Benjamin Herr,	Sucrose and Its Detection,	Kentucky
Jessup, Walter,	Digestive Ferments and Their Uses,	New Jersey
Jones, Evan Albert,	Rhubarb,	Pennsylvania

Name.	*Thesis.*	*State or Country.*
Kelty, Frederick Brauns,	Thymol Iodide,	New Jersey
Kettl, Robert Michael,	Test for the Detection of Rosin,	Pennsylvania
Laubach, Edwin John,	Zinc and Its Official Salts,	Pennsylvania
Lloyd, Harry Ashton,	Antitoxin,	Pennsylvania
McClements, Oliver B.,	Olive Oil,	Pennsylvania
Mann, Charles,	Rhamnus Purshiana,	Pennsylvania
Mehring, Chas. Augustus,	Shall Physicians dispense?	Pennsylvania
Medrano, Joaquin Higinio,	Micro-Pharmacy,	Cuba
Metz, John Bowman,	Scopolamine,	Pennsylvania
Monaghan, Chas. Aloysius,	A Modern Drug Label,	Pennsylvania
Moore, James Kulp,	Emergency Antidotes for Poisons,	Pennsylvania
Olewiler, George Irwin,	Eucalyptus,	Pennsylvania
Orrick, Walter Harper,	Belladonna,	Pennsylvania
Peters, Harold Frederick,	Vegetable Digestive Ferments,	Pennsylvania
Pfeiffer, George Louis,	Diphtheria Antitoxin,	Pennsylvania
Platt, George Hilyard,	Hydrastis,	Delaware
Portugal, José Agustin,	Incompatibility of Quinine Sulphate with the Liberation of Hydrogen Sulphide,	Peru
Reese, Chas. Hoffman,	Gossypium Purificatum and its Uses,	Pennsylvania
Reisch, Wm. Henry,	Is Pharmacy a Profession or Trade?	Pennsylvania
Reuwer, Henry George, Jr.,	Refilling of Prescriptions,	Pennsylvania
Richards, Herbert Leonard,	Coca,	Pennsylvania
Riley, William Guy,	Serum Antidiphthericum,	W. Virginia
Roach, Jeremiah Thomas,	Lactucarium: Its Production and Uses,	Pennsylvania
Robinson, Paul Patton,	Cinchona,	N. Carolina
Russell, Hamilton,	Liquor Magnesii Citratis,	Florida
Scatchard, Elmer E.,	Glycerinated Gelatin Suppositories	New York
Schlitzer, William Frank	Phosphorus,	Pennsylvania
Schomo, Chas. Cornelius,	Sodium Phosphate,	Pennsylvania
Schrader, Curtis Fink,	Phenol,	Pennsylvania
Schwenzer, Carl Wilhelm,	The Improved Spatula,	Indiana
Sharp, Raymond,	Vaccine Virus,	New Jersey
Shear, Lewis Maurice,	Ergot,	Pennsylvania
Shearer, Wm. Reuben,	Liquor Chlori Compositus,	Pennsylvania
Shiffer, Abraham Milton,	Liquor Magnesii Citratis,	Pennsylvania
Shirer, Arthur Enos,	Dried Sulphate of Iron,	Pennsylvania
Shrom, Joseph Alexander,	The History of Antitoxin,	Pennsylvania
Slayton, Edmond Elliott,	Maple Sugar Industry,	Vermont
Slifer, Edward Wilson	Shop and Show Fixtures,	Pennsylvania
Staver, Guy,	Vanillinum,	Pennsylvania
Stouffer, James Cochran,	Cascara Sagrada,	Pennsylvania
Sunday, Harry James,	Berberis,	Pennsylvania
Taylor, Frank Cochran	History of Pharmacy,	Indiana
Thomas, Edward Sutton,	The History of Cinchona,	Pennsylvania
Thomas, Frederick Wm.,	Antiseptics,	W. Virginia

Name.	*Thesis.*	*State or Country.*
Thompson, Wilfred S.,	Liquor Plumbi Subacetatis,	N. Brunswick
Thorley, Samuel Early,	Ammonia Water,	Pennsylvania
Traul, Glenwood Elmo,	Creosote,	Ohio
Walther, Raymond Jos.,	Perfume,	Pennsylvania
Whitacre, Henry W.,	The Pharmacist,	New Jersey
Wilkins, Edwin Elmer,	A Practical and Inexpensive Prescription Cabinet,	New Jersey
Wilkinson, Harry Darnell,	Coca,	New Jersey
Wolf, Raymond John,	The Druggist's Own Preparations,	Pennsylvania
Yost, Frederick Randolph,	A Non-refillable Bottle	Pennsylvania

The following are the names of those receiving the degree of Pharmaceutical Chemist (P. C.), together with the subjects of their theses:

Name.	*Thesis.*	*State or Country.*
Broadbelt, George Harold,	Adulteration and Substitution,	Pennsylvania
Camp, Walter Samuel,	Cotton Root Bark,	Texas
Haines, William Henry,	Pills in General,	New Jersey
Seidman, Harry,	Diluted Acetic Acid,	Russia
Whaland, Berta,	The Rancidity of Fats,	Pennsylvania

The following members of the class were awarded the certificate of Proficiency in Chemistry:

Name.	*State.*
Carlin, Joseph C.	Pennsylvania
Handwork, Francis Collins	Pennsylvania
Heinle, Charles Jacob	Pennsylvania
Hile, Merrill Baird	Pennsylvania
King, William Henry	New Jersey
Roberts, Joseph Griffith	Pennsylvania
Steigerwalt, Frederick Wm.	Pennsylvania
McCambridge, John Edmund, Jr.	Pennsylvania

There were one hundred and twenty-four members of the graduating class coming from various States and countries as follows: California, 1; Cuba, 2; Delaware, 3; Florida, 1; Idaho, 1; Illinois, 1; Indiana, 1; Kentucky, 2; Maine, 1; Maryland, 2; New Brunswick, 1; New Hampshire, 1; New Jersey, 20; New York, 1; North Carolina, 1; Ohio, 1; Pennsylvania, 75; Peru, 1; Russia, 1; South Carolina, 1; Texas, 1; Vermont, 2; Virginia, 2; and West Virginia, 1.

The valedictory address was delivered by the Hon. Robert Adams, Jr. (since deceased).

AWARD OF PRIZES.

The dean, Prof. Joseph P. Remington, announced that the following members of the class received the grade of distinguished:

George Stanley DuBois and Berta Whaland; and the following that of meritorious: Herbert Louis Flack, Charles Roy Grammer, José Agustin Portugal, Hamilton Russell, Elmer Ellsworth Scatchard and Charles Cornelius Schomo.

THE WM. B. WEBB MEMORIAL PRIZE, a gold medal and certificate, offered for the highest general average in the branches of committee, operative pharmacy and specimens, was awarded to Franklin Alfred Butter, the presentation being made by the treasurer of the College, James T. Shinn, Ph.M. The following graduates received honorable mention in connection therewith: George Stanley DuBois and Elmer Ellsworth Scatchard.

THE PHARMACY PRIZE, a gold medal offered by Prof. Joseph P. Remington, for original pharmaceutical work, was awarded to Berta Whaland.

THE CHEMISTRY PRIZE, of $25, offered by Prof. Samuel P. Sadtler, for knowledge of quantitative chemical analysis, was awarded to William Reuben Shearer.

THE MATERIA MEDICA PRIZE, of $15, offered by Prof. Clement B. Lowe, for the best examination in materia medica and in the recognition of materia medica specimens with a meritorious thesis, was awarded to Herbert Leonard Richards. The following graduates received honorable mention in connection therewith: Robert Bunn Anawalt, Wilmot Ayres, Harvey Peter Feigley, Chas. Roy Grammer, and William Christopher Hoffman.

THE MICROSCOPICAL RESEARCH PRIZE, a Zentmayer microscope, offered by Prof. Henry Kraemer, for the best thesis involving microscopical research, was awarded to Berta Whaland. The following graduates received honorable mention in connection therewith: George Covell Davy, Jason Adam Herr, Joaquin Higinio Medrano, and Hamilton Russell.

THE OPERATIVE PHARMACY PRIZE, of $20 in gold, offered by Prof. Joseph P. Remington, for the best examination in operative pharmacy, was awarded to Hamilton Russell, the presentation being made by the recording secretary of the College, Dr. C. A. Weidemann. The following graduates received honorable mention in connection therewith: Frederick John Blinzig, Clarence Eugene Bragdon, William David Burgoon, Oliver Beckett McClements, George Louis Pfeiffer, Elmer Ellsworth Scatchard, Carl Wilhelm

Schwenzer, Lewis Maurice Shear, Abraham Milton Shiffer and Guy Staver.

THE MAISCH PRIZE, of $20 in gold, offered by Mr. Jacob H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was awarded to Bobert Bunn Anawalt, the presentation being made by J. L. Lemberger, Ph.M., President of the American Pharmaceutical Association. The following graduates received honorable mention in connection therewith: Wilmot Ayres, Harvey Peter Feigley, William Christopher Hoffman, and Herbert Leonard Richards.

THE THEORETICAL PHARMACY PRIZE, a Troemner agate prescription balance, offered by Mr. Mahlon N. Kline, for the best examination in theory and practice of pharmacy, was awarded to George Stanley DuBois. Berta Whaland received honorable mention in connection therewith.

THE COMMERCIAL TRAINING PRIZE, of $20 in gold, offered by Prof. Joseph P. Remington, to the graduate who passed the best examination in commercial training at the final examination for the degree, was awarded to George Stanley DuBois, the presentation being made by Walter A. Rumsey, a member of the Board of Trustees. The following graduates deserved honorable mention in connection therewith: Robert Bunn Anawalt, Joseph Colson Andrews, Franklin Alfred Butter, Walter Samuel Camp, Frank William Carl, Frank Lester Cheney, Charles Roy Grammer, Harry Ashton Lloyd, Joaquin Higinio Medrano, José Agustin Portugal, Herbert Leonard Richards, Elmer Ellsworth Scatchard, Charles Cornelius Schomo, Edward Sutton Thomas, Hamilton Russell, Wilfred Steadman Thompson, and Frederick Randolph Yost.

THE INSTRUCTORS' PRIZE, of $20, offered by the Instructors of the College, for the highest term average in the branches of pharmacy, chemistry and materia medica, was awarded to José Agustin Portugal, the presentation being made by Freeman P. Stroup, instructor in chemistry. The following graduates deserved honorable mention in connection therewith: George Stanley DuBois and Charles Roy Grammer.

THE PHARMACY QUIZ PRIZE, one year's membership in the American Pharmaceutical Association, offered by Prof. Charles H. LaWall, for the best term work in theory and practice of pharmacy, was awarded to Herbert Louis Flack. The following graduates received honorable mention in connection therewith: Walter Samuel Camp,

Charles Mann, José Agustin Portugal, Raymond Sharp and Joseph Alexander Shrom.

THE KAPPA PSI FRATERNITY PRIZE, of $20 in gold, offered by the Eta Chapter of the Kappa Psi Fraternity to the graduate making the highest general average during the three years' course at the College, was awarded to Berta Whaland, the presentation being made by Dr. Adolph W. Miller, corresponding secretary of the college. The following graduates deserved honorable mention in connection therewith: Franklin Alfred Butter, George Stanley DuBois, Herbert Louis Flack, José Agustin Portugal, Elmer Ellsworth Scatchard, and Frederick Randolph Yost.

COMPLIMENTARY SUPPER GIVEN BY THE FACULTY.

On Wednesday evening, May 16th, a complimentary supper was tendered the graduating class by members of the Faculty. The supper was given in the museum of the college, and among the invited guests were some of the officers and members of the college. The dean of the Faculty, Professor Remington, acted as toastmaster and short speeches were made by members of the Faculty and Instructors, some of the members of the Board of Trustees and quite a number of the members of the graduating class.

BACCALAUREATE SERMON.

Baccalaureate services were held in the Church of St. Luke and the Epiphany on Sunday afternoon, May 13th, the sermon being delivered by the rector, the Rev. David M. Steele.

ALUMNI ASSOCIATION.

The annual meeting, the annual reception to the graduating class and annual dinner of the Alumni Association of the Philadelphia College of Pharmacy were held during commencement week, and an account of these will be furnished later by the secretary of the Association.

NOTES AND NEWS.

THE WELLCOME HISTORICAL EXHIBITION of rare and curious objects relating to medicine, chemistry, pharmacy and the allied sciences is to be held in London shortly. The exhibition is organized by and under the direction of Henry S. Wellcome, Ph.M., and will be divided into sixteen sections. It is expected that the exhibition will reveal many facts and will elucidate many obscure points in connection with the origins of various medicines and in respect to the history of diseases. Articles of exceptional interest have been promised from different quarters of the globe, and altogether the exhibit promises to be of great value in connecting the more or less isolated and scattered historical data relating to the development of medicine. All communications respecting the Historical Medical Exhibition should be addressed to Henry S. Wellcome, Snow Hill Buildings, London, E. C., England.

PERKIN MEMORIAL AND JUBILEE OF THE COAL-TAR COLOR INDUSTRY.—The year 1906 marks the fiftieth anniversary of the epoch-making discovery by William Henry Perkin of the dye-stuff "Mauve," by which the foundation was laid of the coal-tar color industry and a great stimulus given to the study of organic chemistry. It has been widely felt that the jubilee of the foundation of this important industry should be made the occasion of a fitting public tribute to its founder, in recognition of the great services he has rendered to chemical industry and chemical science by his life work.

A general committee has been appointed in England to arrange for the celebration and is composed of many prominent men, including Dr. F. B. Power, Director of the Wellcome Research Laboratories. The Chemists' Club, of New York City, held a public meeting on April 7th to consider what steps should be taken to give effect to the suggested Perkin jubilee celebration. A large committee of representative men was appointed to make arrangements for a simultaneous celebration in this country. Among the members of this committee are Prof. Charles F. Chandler, Dr. A. R. L. Dohme, Mr. Samuel W. Fairchild, Mr. Albert Plaut, Prof. Samuel P. Sadtler, and Dr. Jokichi Takamine.

PROF. JOSEPH P. REMINGTON, chairman of the Committee on Revision of the United States Pharmacopœia, delivered the valedictory address at the commencement exercises of the St. Louis College of Pharmacy on Wednesday evening, April 25, 1906.

PROF. HENRY H. RUSBY delivered an address on "The History of Botany in New York" at the celebration of the tenth anniversary of the New York Botanical Garden on Wednesday, May 23d. The address was followed by an informal reception in the museum halls, library and laboratories.

DR. JOKICHI TAKAMINE has had conferred upon him by His Majesty the Emperor of Japan, the decoration of the "Order of the Rising Sun," in recognition of his scientific work and attainments.

PROF. OSCAR OLDBERG has written a valuable paper on "The Systematic Amendment of American Pharmacy," which recently appeared in the *American Druggist*, Vol. xlviii, Nos. 2, 3, 4 and 7. All those interested in pharma-

ceutical education and the true advancement of pharmacy will find this article, of which reprints have been made, of great interest.

PROF. WILLIAM M. SEARBY was one of the chief sufferers from the fire following the recent earthquake in California. In a note from him, dated May 11th, he writes: "I lost everything by the fire, but worst of all my library, records, data, etc. But I am well and never was in better spirits."

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.—The twenty-ninth annual meeting will be held in the Glen Summit Springs Hotel, Luzerne County, June 26, 27 and 28, 1906. The first session will be opened on Tuesday, June 26th, at 2.30 P.M.

The hotel where the meeting will be held is first class in all its accommodations, and is located amidst the most magnificent mountain scenery to be found in the country. It is 2,000 feet above the level of the sea, on the crest of Mt. Nescopec, in the hill country of northeastern Pennsylvania. The attendance this year will be large. There will be valuable reports presented, and interesting papers read and discussed. The officers of the Association urge all the members to come, especially those who have never attended a meeting. Mr. George P. Raser, Local Secretary, 429 Arch Street, Philadelphia, has charge of all the local arrangements for the meeting.

OHIO STATE PHARMACEUTICAL ASSOCIATION.—The twenty-eighth annual convention will be held in Cedar Point, on Lake Erie, Ohio, on the 26th, 27th, 28th and 29th of June, 1906, with headquarters at the Breakers' Hotel.

A special train will leave the Grand Central Depot over the Big Four Railroad at 8.10 A.M., Tuesday morning, the 26th of June. This train will carry the Cincinnati delegation through without change to Sandusky. Take the boat at Cedar Point dock. For further particulars and schedule of other delegations address: George B. Kauffman, Columbus Delegation, Front and Chestnut Streets, Columbus, O.; Eugene R. Selzer, Cleveland Delegation, Superior Street, Cleveland, O.; T. B. Huston, Toledo Delegation, Toledo, O.; Frank Amann, Portsmouth Delegation, Portsmouth, O.; H. F. Vortkamp, Lima Delegation, Lima, O.; W. M. Beal, Eastern Delegation, Steubenville, O.; C. S. Ashbrook, Northeastern Delegation, Mansfield, O.

THE MISSOURI PHARMACEUTICAL ASSOCIATION meets at Pertle Springs (Warrensburg), June 12th to 15th inclusive. In addition to the usual interesting and varied programme, the Committee on U.S.P. will this year occupy much of the time and attention of the convention. Chairman William Mittelbach, of Booneville, has arranged for a display of all of the U.S.P. VIII drugs. These will be examined and discussed from the standpoint of the retail druggist and by representatives of the Pharmacopœia. Chemical, microscopical, polariscopic and other tests will be made and discussed.

SECTION OF PRACTICAL PHARMACY AND DISPENSING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—The officers of the Section of Practical Pharmacy and Dispensing cordially invite the co-operation of all retail pharmacists in the work of this section.

Ever since the establishment of the Section great interest has been manifested in the presentation and discussion of difficult and odd prescriptions. The Committee, therefore, have decided to continue this work and make the participation in it as broad and general as possible.

The Committee further believe that a discussion of some of the new preparations of the Pharmacopœia would be of interest and benefit and therefore invite pharmacists to bring with them to the next meeting samples of the following preparations, coming from their own laboratories: cataplasm of kaolin, elixir adjuvans, elixir and glycerite of the phosphates of iron, quinine and strychnine, antiseptic solution, compound cresol solution, compound solution sodium phosphate, effervescing sodium phosphate, compound syrup of hypophosphites, or any other preparation not mentioned.

The Committee also invites members most cordially to write and present a paper on any subject that they may select, relating to the practice of pharmacy and dispensing. Manuscripts must be sent to the chairman of the section at least six weeks before the meeting in order to have them printed in time.

The Committee desire to remind the members that for the best paper or collection of notes read before this Section, Mr. Enno Sander offers the yearly prize of $50.00

The Committee on Practical Pharmacy and Dispensing: Wm. C. Alpers, Chairman, New York; Wm. O. Gross, Associate, Ind.; and H. A. B. Dunning, Secretary, Baltimore, Md.

UNITED STATES PHARMACOPŒIAL CONVENTION.—The sixth annual meeting of the Board of Trustees was held at Washington, D. C., April 28th, with Dr. J. H. Beal, Chairman, Charles E. Dohme, Professor J. P. Remington, Mr. S. A. D. Sheppard and Dr. H. M. Whelpley present.

Progress was reported on a Spanish translation of the Pharmacopœia, but no date was set for its appearance.

The by-laws provide that "the Committee of Revision shall receive such nominal compensation for their services as the board of trustees shall direct." At a previous meeting, the board had voted the sum of $200 for each member of the committee of revision. The board decided that certain members of the committee, having performed exceptional services in connection with the work of revision, should receive additional payments of honoraria, the list being as follows: Charles Caspari, Jr., V. Coblentz, C. Lewis Diehl, Alfred R. L. Dohme, Walter S. Haines, C. S. N. Hallberg, Henry Kraemer, Edward Kremers, A. B. Lyons, H. H. Rusby, Samuel P. Sadtler, W. L. Scoville, E. H. Squibb and A. B. Stevens. The by-laws provide that the members of the board of trustees shall not receive compensation for their services.